

PROCEEDINGS  
OF THE  
CALIFORNIA ACADEMY OF SCIENCES

Fourth Series

Vol. XXVII, No. 4, pp. 77-132

May 31, 1951

---

STUDIES IN THE MALACHIIDAE. III

BY

M. Y. MARSHALL

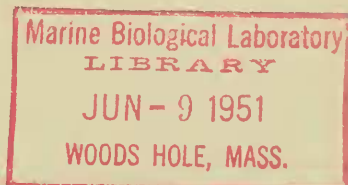
*Murfreesboro, Tennessee*

INTRODUCTION

The primary purpose of the present paper is a revision of the genus *Attalus* Erichson, which has not been revised since Horn (1872) presented his synopsis of the family. However, in gathering together the material necessary for this revision, the collections of the entire family belonging to several institutions were carefully examined and, in the course of this work, which involved the identification of several thousand specimens, a number of undescribed species of other genera were discovered, variational and other noteworthy observations were made on already known species, and unrecorded distributional data were secured on many species. The present occasion is taken to describe these new species and to record these observations and data.

The institutions whose collections of Malachiidae have passed through my hands are The American Museum of Natural History, Cornell University, Ohio State University, University of Idaho, South Dakota State College, and the California Academy of Sciences (*Attalus*). Several private collectors, notably Mr. J. W. Green and Mr. C. A. Frost, have loaned me their material in *Attalus* for study, and I have examined the Leconte and the Fall types in the family, at the Museum of Comparative Zoology, Cambridge, Massachusetts, which has enabled me to make positive identification of several species whose identity remained in some doubt after a perusal of the published literature.

I am indebted to numerous friends and correspondents for the loan or gift of valuable material, the furnishing of copies of unavailable descrip-



tions, and other favors shown me in the course of these studies. Particularly I wish to thank the following: J. W. Green, C. A. Frost, W. S. Barr, Hugh Leech, Mont A. Cazier, Henry Dietrich, J. N. Knull, P. J. Darlington, H. C. Severin, and W. R. Sweader.

The different genera and species, insofar as they are mentioned in the present paper, will be considered in the usual catalogue order.

## TAXONOMY

### *Collops* Erichson

Since the publication of Fall's revision of this genus (1912), only two new species have been described, *C. oklahomensis* Brown (1928) and *C. bridgeri* Tanner (1936). The five species described herewith bring the number to seven. As all of these can easily be interpolated in Fall's excellent, although rather difficult-to-use key, it does not appear that a new key to the genus is necessary at the present time. The difficulty mentioned arises, not through any inability of Fall to draw up an adequate key, but through the fact that many of the species are so variable that individual specimens may be placed with equal propriety in more than one primary division of the key. In fact, the more one scrutinizes Fall's work and has occasion to make use of it, the more one is impressed with the keenness of his powers of observation and the excellence of his judgment.

### *Collops bipunctatus* Say

A series of seven specimens, from Mexico City, D. F., and Atzacapalzaleo (from its Aztec name probably also located in the Distrito Federal) present such a different appearance from the specimens of *C. bipunctatus* taken in the United States that one is tempted to describe them as a geographic race or subspecies. These specimens have the thoracic spots markedly dilated, so as to occupy almost one-half of the entire prothoracic surface. The spots are roughly triangular, with the median edges parallel and narrowly separated by a median red line. They almost attain the anterior thoracic margin and extend about two-thirds the distance from the center to the basal and lateral margins, the lateral edges of the spots roughly paralleling the lateral thoracic margins. The legs and antennae are entirely black, except the first antennal segment and the upper surface of the second segment, in both sexes. In the course of the past two years I have examined probably a thousand specimens of *C. bipunctatus*, from eleven western states. In a small percentage of these, the color of the legs and antennae approaches that seen in the Mexican specimens, but in none of them are the thoracic spots, which are normally a pair of small dots, as indicated by the specific name, more

than slightly dilated. This form probably deserves a separate name, but in the absence of specimens from the extensive range of territory between Arizona and Mexico City, it is possible that it represents only the extreme of a variation which occurs throughout the southern portion of the range of the species. An inspection of the "long series" in the British Museum, which Champion (1914) reports from Durango, would probably tell whether the variation is continuous or discontinuous.

#### **Collops flavicinctus** Fall

In Fall's unique type and in most of the other specimens that I have seen, about fifteen in all, the thorax is black, very narrowly margined with yellow. I have a female specimen from Wickenburg, Arizona, in which the thorax is entirely rufotestaceous, and a male from the Davis Mountains, Texas, in which the thorax is pale, with a broad median black stripe, occupying the middle third. In the same specimen the elytral vittae, which are brighter blue than usual, extend clear to the base, whereas in all the others the pale lateral and sutural margins are continuous across the base; the legs are entirely black, except the anterior femora, there is a piceous spot on the first antennal segment, and the pale frontal margin of the head is narrower than normal and slightly trilobed.

#### **Collops vittatus** (Say)

Fall (1912) states that, in his experience, the elytral vittae are never completely interrupted in this species. I have a male specimen from Hurricane, Utah, which agrees in every other respect with typical *C. vittatus* and which has the elytral vittae completely and broadly interrupted.

#### **Collops histrio** Erichson

It is perhaps worthwhile to again call attention to the extreme variability of this species, both as to color and as to the sculpturation of the prothorax. In a series of ten specimens from Oak Creek Canyon, Arizona, all but three have the elytra entirely black, with the posterior three-fourths of the suture or less and a small wedge-shaped spot near the middle of the lateral margin yellow. In the three exceptions, the elytral spots are very narrowly and incompletely divided. In all of them, the thorax is very shining in the middle third and is dull, minutely rugose, and alutaceous in the lateral thirds. I almost repeated Fall's error, when he described *C. argutus* (1901), by calling this form a new species. Owing to the constancy of the above characters in this locality, it might be entitled to rank as a subspecies, with the advantage of enabling other workers to identify it more easily, but I prefer the more conservative course of considering it as a mere local variation.

### **Collops tibialis** Schaeffer

A male from Nogales, Arizona, has the two basal segments of the antennae and the abdomen entirely pale; the tibiae, tarsi, and anterior femora red; and the middle and posterior femora black. The elytral spots are black, rather than blue. This specimen was sent me by the late Mr. Nunenmacher, under the name *C. spretus* Fall, which I am unable to find in the literature and which is apparently a manuscript name. I believe that it is only an unusually pale form of *C. tibialis*, with which it agrees in all other respects.

### **Collops bridgeri** Tanner

This species was described by Dr. Tanner (1936) from a unique male from Wyoming. The female, to my knowledge, has never been described. Two females, collected by Dr. H. C. Severin at Placid Lake, Montana, agree so well with Tanner's description that I have no doubt as to their identity. One of these is chosen as the allotype and described herewith.

*Female.* Agrees with the description of the male in all respects, except the following. The first two antennal segments are black on the dorsal surface and rufotestaceous beneath. Segments two to seven, inclusive, are moderately and decreasingly serrate, while numbers seven to ten are practically cylindrical. The elytra are oval, widest in the posterior third; the humeri distinctly narrower than the base of the thorax, the wings shorter than the elytra. The last sternite is deeply and longitudinally impressed in the midline. Length 3.2 mm. from anterior edge of thorax to elytral tips.

The single paratype has the two basal antennal segments entirely rufotestaceous, except for the dorsal surface of the proximal half of the first segment, and the anterior margin of the clypeus is narrowly pale. The last sternite is apparently completely divided by the longitudinal impression.

Allotype, female, "Placid Lake, Mont., Aug. 8, 1947. H. C. Severin, Coll.," returned to Dr. Severin at South Dakota State College. One paratype, same data, in author's collection.

A male, from Hanna, South Dakota, 2.8 mm. long, is referred here, although the elytra are dark metallic blue, instead of black. Compared with the two females from Montana, the elytral punctuation is more dense and the decumbent pubescence is light brown instead of white. These slight differences, however, do not appear to justify its description as a new species.

### **Collops arizonensis** Marshall, new species

*Male.* Elongate-oval, elytra slightly widened posteriorly, conjointly rounded. Black, elytra metallic blue, with the central portion of the lateral margin faintly rufescent, a broad margin occupying nearly the lateral third on each side of the prothorax, the entire prosternum, the clypeus and



labrum, the tips of all the palpi and maxillae, the entire first antennal segment, the upper margin and process of the second antennal segment, and all the abdominal segments testaceous. *Head* only moderately shining, very finely and densely punctured and clothed with pale decumbent pubescence and numerous long, black, erect setae, which arise from larger punctures. *Antennae* moderately serrate, the first segment roughly triangular when viewed from the front, the anterior surface conical and prominent, coming to a distinct point, the posterior surface not impressed or sinuate; the second segment viewed from beneath quadrate, about as long as wide, the depression on the upper surface divided into two unequal fossae, the edge of the proximal and larger one of which is pale; the process moderately developed, about as long as the segment itself and clinging closely to the anterior edge of the depression; the tooth which is usually seen on the anterior aspect, near the base of the process, is obtuse and rounded at the tip. *Prothorax* transversely oval, 1.6 times wider than long, slightly narrowed anteriorly, all the angles broadly rounded; more shining than the head, the punctures and decumbent pubescence extremely fine, the black setae numerous and prominent. *Elytra* rather dull, the punctures moderate in size and very dense, in part coalescing, the smooth spaces between the punctures much less than the diameter of the latter, the elytral surface slightly uneven but not definitely tuberculate, rather densely clothed with pale, prostrate pubescence and erect, black setae. *Legs* black, the tibiae and tarsi in part rufescent. *Abdominal segments* yellow, with a lateral piceous spot on either side of each segment, the spots decreasing in size posteriorly. The last sternite is slightly shorter than the pygidium, broadly notched at the tip, carinate in the midline and depressed each side of the carina.

*Female*. Similar to the male in all respects except the following: Slightly broader in proportion to the length; median black thoracic stripe slightly wider; basal antennal segment pale, with a piceous spot on the anterior face; second segment black, with the posterior edge pale; abdomen more heavily maculate with black. The last sternite is black, completely divided in the midline, forming two lateral lobes.

Length, male and female, 4.5 mm.

Holotype, male,; allotype, female; and two female paratypes, "Chiricahua Mts., Ariz., June. D. K. Duncan," in the author's collection.

The paratypes show no variations of any consequence. In one of them, the abdomen is more heavily maculate with black than in the allotype and might be described as black, with the central portion and margins of the segments yellow.

This is probably the form that Fall (1912) mentioned in his remarks under *C. marginicollis* Leconte, when he stated: "Two females from Southern Arizona submitted by Mr. Schaeffer and one from the same region in

my own collection also have entirely black legs but are otherwise scarcely separable. These agree well enough with the short description of *C. aulicus* Erichson, a Mexican species, and may be that, but in the absence of males and of authentic examples of *C. aulicus*, nothing more definite can be said." I have one male of the present species and also one male of *C. aulicus* from Atzacapalzalco, Mexico, which is as authentic as it could well be unless it had been actually compared with Erichson's type.

The present species differs from *C. marginicollis*, not only in the all black legs and almost all black antennae, but in the fact that the elytra are not distinctly tuberculate, as in that species. From *C. aulicus*, which it resembles in general coloration and appearance, it differs by the elytra in *C. aulicus* being of a more brilliant blue color, with the femora blue-black and, more importantly, by the structure of the antennae. The basal segment, in *C. aulicus*, is not triangular or conical in front: it is elongate-cylindrical viewed from the front, and the upper surface is projected backward into a broad, flat wedge, which ends in a right angled tooth at its distal end. The second segment in *C. aulicus* has the tooth on the anterior face much more pronounced and the process much longer, erect and angulated in the middle.

#### **Collops simplex** Marshall, new species

*Male.* Oblong oval, rather depressed for the genus, scarcely widened posteriorly; head, prothorax, and upper surface of first antennal segment black, elytra blackish violaceous, antennae, labrum, tips of mandibles, palpi, entire ventral surface, and legs piceous; under surface of first antennal segment, mandibles, and tarsi testaceous to piceotestaceous. Entire upper surface alutaceous, lower surface shining. *Head* with the front flattened, faintly and irregularly impressed, densely and confluent punctured, the punctures sparser on the occiput; pubescence practically invisible. *Antennae* 10-segmented, stout, feebly serrate, rather long, passing the thorax by about two segments, finely pubescent; the first segment elongate triangular, rounded on the outer end, the second strongly and semi-circularly dilated on its anterior border (the same border as the serrations on the other segments), its base constricted, its upper surface not excavated as is usual in the genus. *Prothorax* quadrate-transverse, 1.5 times as wide as long, all the angles broadly rounded, the sides parallel, the posterior angles slightly and rugosely impressed, surface more densely alutaceous than on the head and elytra, punctuation extremely fine and sparse, pubescence as on the head, with a few short erect black setae near the anterior angles. *Elytra* faintly scabrous, punctures and pale pubescence extremely fine and sparse, with a scattering of short, erect black hairs, also visible only in an oblique light. *Under surface* and legs with fine, sparse, pale pubescence. Last ventral segment as long as the pygidium and divided into the usual two lateral

lobes. Pygidium triangular, with the tip rounded and very feebly emarginate. Anterior tarsi definitely 4-segmented.

Length, 3.3 mm. Female unknown.

Holotype, male, "Tracy, California VII-13-37. E. S. Ross, Collector," in the collection of the California Academy of Sciences.

No paratypes.

This species may be known at once from all our other members of the genus *Collops* by the simply-dilated second antennal segment of the male. This segment is markedly dilated, but not excavated on the upper surface, as in the other species. The question arises as to whether to leave it in *Collops* or to erect a new genus for it. As a precedent for the former course, I quote Abeille de Perrin (1891) who, in defining the genus *Collops*, states: "Antennes de dix articles apparents, le 2<sup>e</sup> *generalment* de forme monstrueuse chez les males." He then describes *Collops cinctus* Gebler, stating: "2<sup>e</sup> (article) plus long, tres gros, irregulierement triangulaire; *convexe par dessus, deprime par dessous*" (the italics are mine).

#### ***Collops pallipes* Marshall, new species**

*Female.* Elongate oblong, elytra slightly widened posteriorly, tricolored above, head black above the level of the lower border of the eyes, thorax testaceous, elytra brilliant metallic blue; entire epistoma and trilobed frontal margin testaceous, the central lobe semicircular; antennae testaceous, the outer segments slightly infusate; under surface, including legs, testaceous, except for the head posterior to the base of the mentum, the meso- and metasterna, the posterior coxae and trochanters, which are piecous black. *Head* shining, bi-impressed between the eyes, very finely and sparsely punctate across the occiput, more densely on the front; pubescence sparse, pale, decumbent, with a few scattered erect, black setae. *Antennae* with the second segment distinctly swollen and about twice as long as the succeeding segments, which are faintly serrate. *Prothorax* transversely oval, about 1.5 times as wide as long, the angles all strongly and evenly rounded, the middle third of the base truncate; surface shining, practically impunctate and glabrous, except for scattered erect, black setae, which arise from minute punctures. *Elytra* shining, non-tuberculate, the punctures dense and moderately coarse, the intervals between the punctures, on the average, about the diameter of the latter, the pale semi-decumbent pubescence rather sparse, the numerous, rather short, erect, black setae evenly distributed. Wings fully developed. Under surface sparsely clothed with pale pubescence, the legs uniformly rufotestaceous in color. Last abdominal segment divided in the midline, forming two lateral lobes or flaps.

Length, 4.0 mm. Male unknown.

Holotype, female, "Brownsville, Texas VIII-8-37. D. J. and J. N. Knull, Collrs." The unique type specimen in being returned to Dr. Knull at Ohio State University.

This species does not run to anything in Fall's (1912) key, because of the combination of unicolorous elytra, fully developed wings, pale prothorax, and uniformly pale legs. Superficially, it most nearly resembles *C. tricolor* Say, which has all black legs. Likewise, it cannot be referred to any species in Champion's (1914) key to the Mexican species for the same reason, regardless of what proves to be the structure of the male antennae.

### **Collops knulli** Marshall, new species

*Male.* Elongate oval, elytra slightly widened posteriorly, wings fully developed. Testaceous, head in large part black, elytra quadrimaculate, with large, narrowly confluent, blue-black spots. *Head* with the epistoma and the anterior portion of the front, almost to the level of the lower border of the eyes, rufotestaceous, the line of demarcation between this and the black portion of the head indefinite; surface only moderately shining, finely and densely punctulate, with fine, dense, pale pubescence; lower portion of the front slightly impressed on either side of the midline. *Antennae* testaceous, the outer eight segments slightly infuscate, scarcely serrate, the first segment elongate triangular, about twice as long as broad, not sinuate or excavate posteriorly, smoothly convex anteriorly; the second segment oval viewed from beneath, with the posterior border somewhat produced, longer than wide, the process long and slender, angulate in the middle and black in the distal half; the tooth on the upper edge of the anterior face blunt and poorly developed. *Prothorax* transversely oval, about 1.5 times as wide as long, the angles all rounded, the posterior more broadly so than the anterior, shining, the punctures extremely fine, the pubescence similar to that on the head, but sparser. *Elytra* moderately shining, the punctures very fine but dense, the pubescence pale and much more dense than on related species, the surface with numerous, evenly distributed, erect, black setae, as on the head and prothorax. The anterior spots are continuous across the base and the posterior attain the lateral margin near the apex. *Underside* testaceous, including all the legs, the meso- and metasterna piceous and the abdominal segments washed with piceous except on their margins. The underside is strongly pubescent, unusually so for the genus, the pubescence on the tibiae practically obscuring the surface. Last abdominal segment acutely emarginate at the apex, the surface of the segment unmodified.

Length, 3.0 mm. Female unknown.

Holotype, male, "Gillespie Co., Tex. V-7-46. D. J. and J. N. Knull." The unique holotype is being returned to Dr. Knull at Ohio State University.

This species runs to *C. similis* Schaeffer in Fall's (1912) key, but *C.*



*similis* is a larger species, the elytra are much more coarsely punctured, the legs are bicolored, and the pubescence is much sparser. In Champion's (1914) key to the Mexican and Central American species it runs to *C. histrionicus* Champion. I have this species from Guatemala. It is also a larger species, the elytra are much more coarsely punctured, the legs are black, and the process of the second antennal segment is much heavier and entirely pale.

### *Collops peninsularis* Marshall, new species

*Male.* Oblong oval, very slightly widened posteriorly; rufotestaceous, head black to the fronto-elypeal suture, elytra with two elongate bluish spots on each, tips of mandibles and palpi and entire metasternum piceous, legs bicolored. *Head* of usual size and shape, surface shining, very finely punctulate, the punctules denser on the front, where the yellow pubescence is decumbent and silky in appearance. The entire upper surface, including head, thorax, and elytra, is generously provided with long, erect, black setae, rather evenly distributed. *Antennae* of moderate length, testaceous, strongly serrate, the first segment, viewed from above, triangular, flattened, twice as long as wide, the anterior edge moderately convex and angulate at the distal end; the second segment large, quadrate, 1.4 times wider than long, the process or appendix short and thick, visible only from above, the excavated upper surface divided into two unequal compartments by a transverse partition, much nearer to the distal end of the segment. *Prothorax* transverse oval, 1.5 times wider than long, the posterior margin faintly sinuate, the anterior slightly produced, the basal marginal bead and posterior angles reflexed; the surface shining, punctuation very fine and sparse, except in the lateral fourths, where it is denser and the surface less shining; pubescence yellow, semi-decumbent, it and the erect black setae rather conspicuous. *Elytra* less shining, finely and densely punctured, the pale pubescence semi-erect and prominent, scutellum black, the basal spots covering the humeri, but not reaching the scutellum; the humeral umbone less densely punctured and strongly shining; the subapical spots not reaching any of the elytral margins. *Pygidium* broadly truncate, piceous, except for basal and lateral margins and a pale central streak. *Under surface* finely and densely punctate and pubescent. Front and middle legs testaceous, except for the coxae and proximal ends of the tibiae, which are piceotestaceous; hind legs piceous, except for the proximal ends of the femora and the tarsi, which are testaceous.

*Female.* Similar to the male, except for the sexual characters. The antennae, beyond the first three segments, are piceous, and the legs are darker than in the male, being piceous or piceotestaceous, except for the proximal portions of the femora. The last sternite is piceous, except for the margins,



and is depressed in the midline, the entire lateral halves of the segment forming a V-shaped trough.

Length, male 5.0 mm., female 4.0 mm.

Holotype, male and allotype, female, collected by Michelbacher and Ross, "20 mi. n. Comundu, L. Cal. VII-2-38," in the collection of the California Academy of Sciences. No paratypes.

The species runs to *C. confluens* Leeonte in Fall's (1912) key and to *C. femoratus* Schaeffer in Champion's (1914) key. From *C. confluens* it may be separated by its larger size and much finer punctuation. It more nearly resembles *C. femoratus*, which, however, also has the elytra more coarsely punctured, the antennae much less strongly serrate and the second antennal segment differently shaped and not wider than long.

### Trophimus Horn

#### Trophimus aeneipennis Horn

The males of this species show secondary sexual modifications of the ventral segments which have not been observed in any other North American representative of the family and from which they can be more easily identified than by counting the protarsal segments, which in mounted specimens are often difficult to see clearly. These characters are not mentioned by Horn in his original description and have not, so far as I know, been previously noted in the literature. The third sternite is black, heavily chitinized and projects over the fourth in an obtusely angled lobe, whose free edge is thickly and finely setose. The last three segments are pale, the fourth very narrow, practically concealed by the above-mentioned lobe, the fifth wider and occupied almost entirely by two large, shallow pits or depressions, one on either side of the midline. The species superficially resembles *Tanaops minus* Fall rather closely and has been found mixed with the latter in collections.

### Attalusinus Leng

#### Attalusinus submarginatus Leeonte

A female of this very rare species, from Yuma, Arizona, has been compared by the author with Leeonte's unique female type at the Museum of Comparative Zoology and found to be identical with the latter. The color is aeneous black, with the thorax obsoletely rufescent, as described by Leeonte. The specimens in the National Museum under this name, which were mentioned in a previous paper (Marshall, 1949) are all much paler in color, a yellowish testaceous, as I recall them, and larger. Mr. Barber is probably correct in his statement that none of the three species in that collection is *A. submarginatus*. I hope to be able to describe them in a subsequent paper.

**Tanaops** Leconte**Tanaops complex** Fall

A series of fourteen specimens of this rare species, from the Chiricahua Mountains, Arizona, all have the thorax black, except two specimens, one of which has an all red thorax, as did the pair from which Fall (1917) described the species, and the other of which has the posterior angles red. The color of the thorax is of no value in separating the closely allied *T. mimus*, *T. coelestinus*, and *T. complex*. These specimens all show a shining, denuded spot on each side of the prothorax, of variable size, near the posterior angles, which is obviously a characteristic of the species. This does not show up nearly so plainly in the specimen with the red thorax, which is probably the reason that Fall overlooked it in his two specimens.

**Tanaops spinifer** Fall

The acquisition of new material, from the Huachucha Mountains, Arizona, has caused me to reverse my identification of two species, this one and *T. terminalis* Fall. The species which I had identified as *T. spinifer* was represented in my collection by four males and four females, whereas *T. terminalis*, so called, was represented by only a single female. Additional males and females, three each, clear up the ambiguity created by Fall (1917) when he stated in his key that the front *coxae* of *T. spinifer* were spined and in his description that the front *trochanters* were spined. The recently acquired males have the front *trochanters* terminated distally in a prominent acute spine, which is easily observed. The remarks which I made concerning *T. spinifer* in the first number of these studies (Marshall, 1946) apply to the species which I now identify as *T. terminalis*.

**Tanaops terminalis** Fall

A series of ten specimens, four males and six females, from the Chiricahua Mountains and Catalina Mountains, Arizona, correspond in all important features with Fall's (1917) short description of that species, but is obviously distinct from the species just mentioned, which I have identified as *T. terminalis*, from the Grand Canyon region. It would serve no purpose to describe the differences here, since it would be impossible to be sure which of the two species is really *T. terminalis* without an opportunity to re-examine Fall's type. The same remarks apply with equal force to a single female from Banning, California.

**Anthocomus** Erichson

The species formerly listed under the genera *Malachius* and *Microlipus*, excepting *Malachius aeneus* Linnaeus, have been placed in the genus *Antho-*

*comus* (Marshall, 1949), and the following two species, formerly in *Malachius*, are therefore considered under *Anthocomus*.

#### ***Anthocomus biguttulus* (Horn)**

The females, like those of *A. mixtus* (Horn), at times occur without any apical pale areas. Of five specimens, collected at Independence, California, two have faint apical pale areas and three no trace of such areas.

#### ***Anthocomus directus* Fall**

A series of about thirty specimens, collected at Keen Camp, Riverside County, California, by D. J. and J. N. Knull, correspond to Fall's (1901) description of this species in every particular except the color of the prothorax, which in the type has the sides "broadly yellow." A pair from this series, male and female, have been compared by the author with Fall's types in the Museum of Comparative Zoology, at Harvard University. In all of the specimens of the series the thorax is wholly black, except in one male, in which the hind angles are rather broadly yellow, as noted by Fall in "other specimens" which he stated were "quite surely the same thing." Since the color of the thorax is notoriously variable in this family, one would not be justified in giving a new name to this dark form. The tips of the elytral appendages, which are closely applied to the inferior surface of the elytral tips, extend beyond the latter to a variable degree and, in most cases, are thickened and black.

#### ***Anthocomus ventralis* Horn**

Examination of the two cotypes, one male and one female, in the Ulke collection, now in the Carnegie Museum in Pittsburgh, which were kindly sent to me for study by Dr. Walter R. Sweader, has enabled me to resolve the doubts as to the identity of this species which were expressed in a previous paper (Marshall, 1949). The Ulke collection contains three specimens labeled *Anthocomus ventralis*, the two cotypes, simply labeled "Ariz.," and a male of a species of *Tanaops*, from Texas. Horn gives no description of the male elytral appendages in *A. ventralis* and does not even state the sex of his two cotypes. The male has the elytra appendiculate as in *A. erichsoni* Leconte, and a careful comparison of the male type with males of *A. erichsoni* from New York and Kentucky convinces me that *A. ventralis* is not specifically distinct from *A. erichsoni* and is at most entitled to rank as a subspecies of the latter.

The only distinguishing characters that Horn gives for *A. ventralis* are the entirely yellow thorax and abdomen, which is not strictly true in either case. The prothorax of the male cotype shows two faint piecous spots in the

midline, one almost adjacent to the basal margin and the other, slightly larger, somewhat more remote from the anterior margin. I have a female of *A. erichsoni*, from Kentucky, which has the usual dark thoracic stripe almost as much reduced. Also, the pair of piceous spots on each abdominal segment, which in *A. erichsoni* occupy the greater portion of the segment, are faintly discernible in the male type of *A. ventralis*. The female type, as in *A. erichsoni*, has the abdomen rufotestaceous, with the last sternite piceous. The modifications of the elytral tips in the two forms, which are quite unusual and distinctive, appear to be identical down to the smallest details, such as the border of stiff hairs and the beading of the inner margin and tip of the broad, triangular appendix on the under side.

#### *Anthocomus barri* Marshall, new species

*Male.* Elongate, parallel, the elytra scarcely widened posteriorly. Black, the thorax faintly aeneous, the elytra with a faint bluish tinge. Narrow margin of prothorax, excepting the base, testaceous, this margin wider at the posterior angles. Entire surface moderately shining. *Head* with a central and two lateral impressions, the former rounded and located at the junction of front and occiput, the latter elongate and on the front; surface minutely punctulate and pubescent. *Antennae* pectinate and more strongly pubescent, the pectination of segment six exactly as long as the segment itself, when measured on the outer edge of the angulation, that of segment seven three-fourths the length of the segment, the pectinations of the other segments gradually decreasing toward either end of the antenna; pectinations elongate triangular in outline, evenly tapering to an acute point. *Antennae* long, reaching about the middle of the elytra. *Prothorax* quadrate, one-fifth wider than long, the sides slightly converging anteriorly, the apex somewhat produced, the posterior angles and base rather strongly reflexed, the surface extremely finely punctulate and pubescent, about as on the head. *Elytra* scabrous, punctures not discernible, the pubescence extremely short, fine, pale, and inconspicuous. Apex of each elytron produced into two teeth, the larger sutural, acutely pointed, grey in color and of thinner texture than the balance of the elytron, the smaller blunt and separated from the other by a small semicircular notch. Elytral appendices grey, oval in outline, not emarginate, extending beyond the elytral tips to a moderate degree and with a transverse anteapical ridge or thickening. The processes rather slender, not contorted, slightly shorter than the appendices, which, together with the sutural tooth, are covered with a fine, white silky pubescence. The long axes of the appendices and processes converge posteriorly. *Underside* entirely black, the legs and sterna finely, densely punctate and with a white pubescence, which is denser than that on the upper surface. Abdominal segments more sparsely punctured and pubescent, the terminal segment deeply



and acutely emarginate, with a depression on either side of the emargination; the pygidium squarely truncate and with rather dense, long, white pubescence. Sheath of the adeagus long, black, cylindrical, bivalved at the tip.

*Female.* Similar to the male, except in the following respects. The thorax and elytra are more conspicuously pubescent; the pale thoracic margin disappears anteriorly, as well as posteriorly; the antennae are moderately serrate and shorter; the elytral tips are pale at the sutural angle and the last sternite is entire and convex.

Length, male and female, 3.5 mm.

Holotype, male and allotype, female, "McKittrick, Cal. III-21-40 W. F. Barr." Types to be deposited with the California Academy of Sciences, San Francisco, at request of Dr. Barr. Six female paratypes, two with the same data as the types, four from Clear Creek, Cuyama Valley, California, III-22 and 23-40. Paratypes in the author's collection and in that of Dr. Barr.

The only variation noted in the paratypes concerns the amount of pale coloration of the prothoracic margins and the elytral apices. In two specimens, the lateral pale margins are much wider than in either of the types, whereas in one the pale color is confined to the posterior angles. The pale elytral tips are smaller in some specimens than in the allotype, and in one are so small as to justify the assumption that, in all probability, females occur with the elytra entirely black.

This species runs to *A. theveneti* Horn in my recent table of *Anthocomus* (Marshall, 1949). There are specimens of *A. theveneti* in my collection identified by both Fall and Blaisdell. It is a larger species, 5 mm. long, the elytra are more definitely blue, the prothorax is rufous with a large black discal spot and the elytral appendages are entirely different, in that the prolongations of the elytral apices proper are longer and rounded at the tips, the appendages are deeply emarginate at their tips, and the processes are heavier and longer, projecting well beyond the tips of the appendages.

#### ***Anthocomus atratus* Marshall, new species**

*Male.* Elongate, oblong, parallel, the elytra not perceptibly widened behind. Color uniformly black, without metallic luster, entire surface faintly shining, somewhat alutaceous. *Head* faintly impressed between the eyes, with a small rounded central impression and two elongate lateral impressions, sparsely and minutely punctulate and pubescent. *Antennae* pectinate, reaching to about the middle of the elytra, the pectinations triangular, sharply pointed, those on the intermediate segments longest and slightly shorter



than the length of the segment. *Prothorax* quadrate transverse, 1.4 times wider than long, the sides parallel, the apex slightly produced, all the angles broadly rounded, the posterior angles and base moderately reflexed, punctuation and pubescence as on the head. *Elytra* very scabrous, much of the rugosity taking the form of fine, wavy transverse lines, the punctures not discernible in the roughened surface, the decumbent pubescence very fine, white and inconspicuous. There is a minute tooth at the sutural angle of each elytral apex and a simple appendage, black, broader than long, with an entire, broadly rounded edge, that projects slightly beyond the apex of the elytron. *Underside* slightly more shining than the upper, with sparser pubescence, except for the legs. The last sternite is shorter than the pygidium and completely divided into two pineer-like lobes with an oval opening between them for the aedeagus. Pygidium quadrate, with sides parallel and apex truncate, apical angles narrowly rounded and apex shallowly emarginate in the center.

*Female*. Similar to the male, except in the following respects. Antennae shorter and moderately serrate. Posterior angles of prothorax narrowly testaceous. Elytral tips unmodified. Abdominal segments piecous, the terminal segment broader and shorter than usual, slightly shorter than the pygidium, tumid just behind the anterior margin, the tip broadly rounded, with a minute notch in the center. Pygidium quadrate, the sides slightly sinuate and converging posteriorly, the apex truncate and shallowly emarginate in the center.

Length, male 3.0 mm., female 3.5 mm.

Holotype, male, and allotype, female, "**Walker Pass, Kern Co., Cal.** IV-3-42. W. F. Barr, Collector." Types to be deposited with the California Academy of Sciences, at the request of Dr. Barr. Described from a single pair.

The species runs to *A. directus* (Fall) in my key to the genus (Marshall, 1949), but in size and color it more nearly resembles *A. nigrinus* (Fall). *Anthocomus directus* is a larger species, the elytra have a definitely greenish color and are not so scabrous, the antennal pectinations are much longer and are rounded or spatulate at the tips and the elytral appendages are longer than wide, more projecting and narrowly rounded at the tips; the basal portion of the appendage is pale, the terminal portion thickened and black. *Anthocomus nigrinus* is at once separated by the fact that the elytra of the males are not appendiculate; the females may be recognized by their more shining, scarcely scabrous elytra.

Two other undescribed species in this genus are represented only by females, and they will not be described until corresponding males are forthcoming, as they could not be identified by any known key.

**Pseudebaeus Horn****Pseudebaeus apicalis Horn**

*Pseudebaeus oblitus* Leconte (new synonymy).

A series of specimens of *P. oblitus*, from Graybeard Mountains, North Carolina, contains several males whose prothoraces are paler, in varying degree, than is the case in typical *P. oblitus*. In one of these the prothorax is testaceous, with the anterior one-fourth piceous, the dark color extending posteriorly in a median stripe to the base and in two lateral lobes about two-thirds the distance to the base. It would be but a short step from this to the coloration described by Say for *P. apicalis*: "thorax sanguineous, dusky on the anterior margin." The color of the prothorax is the only distinguishing character between the two species given by Horn (1872), and an examination of the original descriptions fails to disclose any other differential characters. I am forced to conclude that *P. oblitus* is merely a dark color phase of *P. apicalis*, which name has priority, possibly entitled to rank as a color variety, but not as a distinct species.

**Nodopus Marshall, new genus**

Antennae 11-segmented, feebly serrate, inserted at the sides of the frontal margin, contiguous to the clypeal suture; clypeus transverse, short, membranous anteriorly; labrum transverse, as long as the clypeus, quadrate, the tip truncate, the angles rounded; maxillary palpi 4-segmented, the first segment very short, the second and third equal, the fourth elongate, acuminate; labial palpi very small, only two segments visible; ligula membranous, rather deeply retracted into the oral cavity; mandibles bifid at the tip; head short, eyes prominent; thorax quadrate, transverse; elytra long, covering the abdomen, the tips simple in both sexes; all the tarsi 5-segmented, the first segment of the male protarsi with a rounded projection on the inner side, almost as large as the segment itself.

The genotype is *N. caviceps*, new species.

The following modification of my recently published key to the genera (Marshall, 1949) is necessary in order to show the relation of this genus to neighboring genera:

- |  |                    |
|--|--------------------|
| 9. Male protarsi unmodified .....  | 10                 |
| Male protarsi with either the first or the second segment modified.....  | 11                 |
| 10. Elytral tips of male prolonged and with small cup-shaped process extending upward from the tip of each elytron.....                | <i>Pseudebaeus</i> |
| Male elytra modified or not; if so, the tips are split horizontally with a variously shaped process below the plane of the elytra..... | <i>Anthocomus</i>  |

11. First segment of male protarsi with a rounded protuberance on the inner side  
 ..... *Nodopus*  
 Second segment of male protarsi prolonged in a lobe over the third..... 12
12. Form elongate; male antennae pectinate.....*Acletus*  
 Form relatively broad, antennae never more than moderately serrate....*Attalus*

### ***Nodopus caviceps* Marshall, new species**

*Male.* Elongate, oblong, slightly widened posteriorly. Black, the clypeus, antennal foveae, under surface of first three antennal segments, prothorax except for a central black spot, genae and mandibles yellowish testaceous; labrum, palpi, tips of mandibles, antennae and all the tibiae and tarsi piceous, the tibiae becoming testaceous toward their proximal ends. *Head* short, the eyes quite prominent, the frontal surface strongly depressed or excavated on either side of the midline and as far as the eyes, leaving a sharp median carina that fades out anteriorly. The depressed areas terminate posteriorly in a bisinuate ridge, that starts at the posterior border of each eye and joins the median carina at the junction of the frons and occiput, forming a prominent, sharp tubercle at this point. The depressed areas, which occupy at least one-half the dorsal surface of the head, are glabrous and impunctate; the rest of the head shows fine punctures, becoming aciculate on the occiput, and a fine, decumbent, pale pubescence. *Antennae* long, reaching almost the middle of the elytra, feebly serrate. The upper distal angle of the first segment, viewed from beneath, is prominent and the second segment is deeply sinuate just distal to this prominence. The labrum is prominent and is bent down over the mandibles in front, concealing their tips. *Prothorax* quadrate, 1.5 times wider than long, the sides slightly converging posteriorly, all the angles rounded, the base and posterior angles rather strongly reflexed; surface moderately shining, very finely punctulate and with pale pubescence. The discal black spot is anteriorly placed and fades out toward the base. *Elytra* moderately shining, densely and finely punctulate and pubescent, the decumbent pubescence white and dense, with no erect setae present. *Under surface* black, except for the narrow yellow prosternum, mesosternal epimera and central membranous portions of the abdominal segments; together with the legs, very finely punctured and pubescent. First segment of the male protarsi with the rounded protuberance characteristic of the genus. Pygidium large, quadrangular, the sides converging posteriorly, the apex truncate, with the angles rounded; the surface feebly impressed in the midline and covered with sparse, long, pale pubescence. Last sternite shorter than the pygidium, deeply and acutely emarginate at the tip; the aedeagus with the usual cylindrical sheath split at the tip to form a short dorsal and a longer ventral lobe.

*Female.* Similar to the male, except as follows. Antennae shorter and

scarcely serrate; head and anterior tarsi unmodified; labrum shorter, exposing the mandibles; clypeal suture sinuate in the middle; clypeus, labrum, genae, mouth parts and legs uniformly piceous; black discal spot on pronotum larger, forming a wide median stripe, which reaches the apical, but not the basal, margin; pygidium similar to that of male, but more narrowed toward the tip and not impressed; last sternite entire, almost as long as the pygidium.

Length, male 2.3 mm.; female 2.6 mm.

Holotype, male and allotype, female, collected by Dr. H. Dietrich, at **Lucedale, Mississippi** III-10-1930; in the collection of Cornell University. No paratypes.

If the characteristic modification of the male protarsi should escape notice, this species would probably be mistaken for *Attalus tuberculifrons* Fall, as was done at first by the author. I have examined the unique male type of *A. tuberculifrons*, in the Museum of Comparative Zoology, and made the following notes: "The frontal tubercle is rounded and is formed by two depressions, which do not extend up and behind the eyes, as in *N. caviceps*. The entire occiput is evenly rounded and without a transverse carina. The head is yellow, except for the black occiput; thorax black with yellow margins; basal half of lateral clytral margins yellow; second protarsal joint clearly lobed."

A review of the description of all the European genera of Malachiidae, as given by Abeille de Perrin (1891) fails to disclose any which possesses the peculiar tarsal modification shown by this species. The pronounced excavation of the head strongly resembles that seen in various species of *Hedybius* Erichson, a South African genus, but the male protarsi in this genus, according to Champion (1921), are either simple or have the second segment lobed, as in *Attalus*. It is further unlikely that a single representative of a genus confined to South Africa would occur in the United States. *Carphurus* Erichson and its derivative genera, one species of which is reported later in this paper as occurring in Lower California, also have the male first protarsal segment modified, but the modification is very different from that occurring in *Nodopus*, consisting of a heavy black comb along the inner edge of the segment, which is frequently elongated.

#### **Attalus** Erichson

The only key which has been published for the North American species of this genus is that of Horn (1872). He included 22 species in his key, omitting *A. rufomarginatus* (Motschulsky). In 1894, Horn described two new species from Lower California; in 1879, Fall described one species from the islands off the coast of southern California; in 1910, Blatchley described two varieties from Indiana and in 1914 one new species from Florida. In



1912, Fall described 12 new species and gave a key by which they might be separated among themselves. In 1920, Leng listed 39 species and two varieties in his catalogue, including *A. subfasciatus* Gorham, a Mexican species, from Arizona, on whose authority I do not know. Since that time five new species and one subspecies have been described, one by Blatchley (1922), one by Hopping (1937), one by Marshall (1946), and three by the same author (1949). With the 11 new species to be described herewith, it becomes necessary to include 57 species or forms in the present key, *A. paralellus* Horn having been reduced to synonymy with *A. rufiventris* Horn by Fall (1917), and *A. nigrellus* Leconte having been transferred back to the genus *Acletus* by the present author (1949). In 1914, Champion listed 52 species of *Attalus* from Mexico and Central America. Two of these belong to the genus *Tanaops*, and two others are known to occur in the United States. This gives a total of 105 species of *Attalus* described from the North American continent to date, not taking into account any which may have been described by other European authors since 1914 and of which I have no knowledge. The probability is that many more species remain to be described from Mexico and Central America before our knowledge of the genus is complete, and it is my intention to enter this field in the next number of these studies, beginning with a collection of Malachiidae from Mexico, made by an expedition from the American Museum of Natural History in the summer of 1947, which Dr. Mont A. Cazier has kindly agreed to turn over to me for study.

Both Horn and Champion based their keys to the genus largely on differences in color and Fall did the same in the short key which he gave for his 12 new species in 1917. The color is quite variable in many of the species but, on the other hand, structural peculiarities are scarce in the genus, and most of the few used by Champion do not occur in any of our species. Good characters are found in several species in the modifications of the abdominal segments in the male and in the size and shape of the pygidium and terminal sternite in both sexes, most of which have not previously been recorded. I have taken advantage of these where they occur and have to some extent obviated the disadvantage of color variability by placing certain variable species in more than one portion of the key.

The relative length and width of the head was the character used by Horn to separate a small group of long-headed species which superficially resemble *Tanaops*. His primary distinction was between "Head elongate, longer than wide. Front nearly flat" and "Head broad, front convex." He included one, however, in the broad-headed species which my measurement shows to have the length 1.06 times the width and three which have the length and width exactly the same. In order to determine whether this character is still available as a primary distinction with the increased number of species, I measured the length and width of the head in 48 species



and found the length-width ratio to vary from 0.76 to 1.38, 29 species having a ratio less than 1.0 (short head) and 14 a ratio greater than 1.0 (long head). In five species the length and width of the head were exactly the same. Eighteen species had the ratio between 0.91 and 0.94 and the entire series showed a rather uniform distribution curve, with no definite separation into two groups. With one exception, the greatest difference between adjacent ratios was 0.04. This exception, a difference of 0.11, occurred between the ratios 1.25 and 1.36 and served to separate only three exceptionally long-headed species. When it is considered that, in all probability, species will be discovered that will fall between these limits and also that the apparent length of the head is affected by the degree of flexion present, exposing more or less of the occiput, as well as by the degree of extension of the elastic membrane between the labrum and the elypeus, it becomes obvious that this character is not suitable as a primary distinction, although it is useful in separating certain species that superficially resemble one another. A further argument against the primary use of this character, if any were needed, is its variability within the limits of a single species. For instance, in 10 specimens of *A. nigripes* Horn, the ratio varied from 0.96 to 1.25. All but four of these specimens would have been erroneously placed, by Horn's key, in the long-headed group.

KEY TO THE NORTH AMERICAN SPECIES OF *ATTALUS*, NORTH OF MEXICO

- |   |                                   |
|---|-----------------------------------|
| 1. Elytra entirely black or piceous.....  | 2                                 |
| Elytra not entirely black or piceous.....   | 21                                |
| 2. Head and thorax rufotestaceous.....  | 3                                 |
| Head and thorax at least in part dark.....  | 4                                 |
| 3. Abdomen pale rufous .....  | <i>A. melanopterus</i> (Erichson) |
| Abdomen black .....   | <i>A. atripennis</i> Fall         |
| 4. Thorax entirely black or piceous.....  | 5                                 |
| Thorax not entirely black or piceous.....   | 14                                |
| 5. Upper surface nearly glabrous.....   | <i>A. glabrellus</i> Fall         |
| Upper surface distinctly pubescent.....   | 6                                 |
| 6. Male with ventral foveae; last tergite notched at tip.....                           | <i>A. rusticus</i> Fall           |
| Male without ventral foveae .....   | 7                                 |
| 7. Form broadly oval; length 1.8 mm. or less.....                                       | 8                                 |
| Form oblong, only slightly dilated posteriorly; length 2.0 mm. or more.....             | 9                                 |
| 8. Legs all pale testaceous; elytra minutely granulate.....                             | <i>A. granularis</i> (Erichson)   |
| Femora black; elytra not granulate.....   | <i>A. australis</i> Blatchley     |
| 9. Color uniform piceous, bronzed, shining; legs in part pale; 2 mm.; Lower Calif. .... | <i>A. unicolor</i> Horn           |
| Color black, not at all bronzed; larger than 2.0 mm.....                                | 10                                |

10. Elytra sooty and faintly iridescent; last tergite of male squarely truncate.....  
 .....*A. pallifrons* (Motschulsky)  
 Elytra not sooty or iridescent; last tergite of male not truncate..... 11
11. Female with a deep notch at apex of last sternite, which is convex; male with last tergite parabolic, with a small semicircular notch at apex..... 12  
 Female with last sternite concave and unmodified at apex; male with last tergite triangular and widely emarginate at apex.....*A. greeni* Marshall
12. Apical notch in female deep, more than one-half length of segment, which is more convex, less shining, more densely and coarsely pubescent.....  
 .....*A. frosti*, new species  
 Apical notch in female smaller, less than one-half length of segment, which is less convex, more shining, more sparsely and finely pubescent..... 13
13. All the legs testaceous in both sexes, except the hind femora, which are mostly piceous.....*A. morulus smithi* Hopping  
 All the legs piceous, the anterior pair in the males usually pale.....  
 .....*A. morulus* (Leconte)
14. Males with ventral foveae..... 15  
 Males without ventral foveae ..... 16
15. Males with a white scale-like structure projecting from the posterior margin of the fourth sternite; last tergite not notched at the tip.....  
 .....*A. illinoisensis*, new species  
 Males without such a structure; last tergite notched at the tip.....  
 .....*A. foveiventris* Fall
16. Head entirely black (clypeolabral membrane excepted)..... 17  
 Head not entirely black..... 20
17. Abdomen black in both sexes; thorax with basal margin narrowly pale; elytra markedly dilated posteriorly.....*A. lecontei* Champion  
 Abdomen not entirely black in both sexes, black in female, more or less pale in male; thorax variable; elytra only moderately dilated posteriorly..... 18
18. Surface densely pubescent; males with a ventral scale, as in *A. illinoisensis*.....  
 .....*A. grisellus* Fall  
 Surface moderately or sparsely pubescent, males without ventral scale..... 19
19. Smaller, 1.6-2.0 mm.; pubescence moderate; thorax black with posterior angles pale.....*A. futilis* Fall  
 Larger, 2.0-2.5 mm.; pubescence sparse; thorax rufous, with variable dark discal area.....*A. nigripes* Horn
20. Larger, 2.5-3.0 mm.; elytra sooty black; thorax pale, with median black stripe; pygidium truncate.....*A. otiosus* (Say)  
 Smaller, 2.0-2.5 mm.; elytra shining piceous-black; thorax black with yellow margin of variable extent (at times entirely black); tip of pygidium rounded and notched at apex.....*A. scincetus confusus* Blatchley
21. Elytra black or piceous, with tip narrowly pale..... 22  
 Elytra colored otherwise..... 26

22. Head in part or wholly pale..... 23  
 Head black ..... 25
23. Elytra and abdomen piceous; head yellow anterior to middle of eyes.....  
*A. scincetus confusus* Blatchley  
 Elytra black, abdomen rufous..... 24
24. Elytra greenish black; head rufous with black spot of variable size each side  
 of occiput.....*A. semirubidus* Fall  
 Elytra black or bluish black; head entirely pale.....*A. marginipennis* Blatchley
25. Elytra black; pale color confined to exact tips (extending narrowly up lateral  
 margin for short distance in most males).....*A. terminalis* (Erichson)  
 Elytra piceous; pale color extending up suture for a short distance, but not  
 touching it.....*A. varians* Horn
26. Head and thorax concolored, pale..... 27  
 Head and/or thorax at least in part black..... 36
27. Antennae unusually heavy and strongly serrate; elytra rufous with apical and  
 basal spots; terminal segments (both dorsal and ventral) unusually large.....  
*A. serraticornis* Fall  
 Antennae feebly or only moderately serrate..... 28
28. Elytra pale with black humeral spot.....*A. humeralis* Leconte  
 Elytra otherwise colored..... 29
29. Elytra pale with apical and basal spots..... 30  
 Elytra otherwise colored..... 32
30. Tarsi and tibiae black; elytra dull.....*A. rufiventris* Horn  
 Tarsi and tibiae pale..... 31
31. Upper surface shining; Eastern.....*A. pettiti* Horn  
 Upper surface alutaceous; Lower California.....*A. balteatus*, new species
32. Elytra black, dull, with suture and apices rufous.....*A. rufiventris* Horn  
 Elytra otherwise colored..... 33
33. Elytra with scutellar pale area and elongate piceous spot from humerus to apex  
 .....*A. tucsonensis*, new species  
 Elytra entirely pale or with an ill-defined subapical spot..... 34
34. Male with ventral scale; surface dull, densely pubescent.....  
 .....*A. oregonensis rubyae*, new variety  
 Male without ventral scale, surface shining, sparsely pubescent..... 35
35. Larger, 4.0 mm.; elytra long.....*A. tucsonensis sanctus*, new subspecies  
 Smaller, 1.8 mm.; elytra short.....*A. sulphureus*, new species
36. Antennae unusually heavy and strongly serrate; elytra rufous with apical and  
 basal spots.....*A. serraticornis* Fall  
 Antennae feebly or only moderately serrate..... 37

37. Head with an elongate frontal tubercle.....	<i>A. tuberculifrons</i> Fall	37
Head not tuberculate.....		38
38. Elytra black, with antemedian pale fascia.....		39
Elytra not fasciate.....		40
39. Thorax strongly narrowed behind.....	<i>A. transmarius</i> Fall	
Thorax rounded at the sides, not narrowed behind.....	<i>A. subfasciatus</i> Gorham	
40. Elytra with apical half black, basal half yellow.....	<i>A. dimidiatus</i> Fall	
Elytra otherwise colored.....		41
41. Male with a white, scale-like structure, projecting from the posterior margin of the fourth abdominal segment; elytra pale with black median vitta on each.....	<i>A. oregonensis</i> Horn	
Male without ventral scale.....		42
42. Elytra pale except for piceous scutellar area and with scattered erect, black setae.....	<i>A. setosus</i> Horn	
Elytra otherwise colored.....		43
43. Head black (clypeolabral membrane excepted).....		44
Head at least in part pale.....		48
44. Head long, one-half longer than wide.....	<i>A. rostratus</i> Horn	
Head short, not longer than wide.....		45
45. Sutural margin of elytra black.....	<i>A. diffusus</i> , new species	
Sutural margin of elytra pale.....		46
46. Larger, 2.0-3.5 mm.; thorax pale with broad median black stripe; elytra black with all margins (except the basal) narrowly and uniformly yellow.....	<i>A. circumscriptus</i> (Say)	
Smaller, not over 2.0 mm.; thorax black with basal and lateral margins narrowly pale (at times anterior margin also pale and black discal area trilobed in <i>A. lobulatus</i> ).....		47
47. Sutural margin broad, strongly dilated anteriorly, not reaching the scutellum.....	<i>A. lobulatus</i> (Leconte)	
Sutural margin narrow, uniform, not dilated, usually reaching the scutellum.....	<i>A. utahensis</i> , new species	
48. All elytral margins, including basal, pale.....	<i>A. cinctus</i> (Leconte)	
Basal elytral margins not pale.....		49
49. Elytra pale yellow with sutural and, at times, lateral margins piceous.....	<i>A. scincetus</i> (Say)	
Elytra otherwise colored.....		50
50. Elytra piceous, with apex, juxtasutural stripe and lateral marginal spot whitish.....	<i>A. zebraicus</i> Blatchley	
Elytra otherwise colored.....		51
51. Elytral tips black, lateral and sutural margins narrowly and indefinitely paler.....	<i>A. dilutimargo</i> Fall	
Elytral tips pale.....		52

52. Elytra pale with common basal spot and subapical spot in each, black.....  
 .....*A. trimaculatus* (Motschulsky)  
 Elytra otherwise colored..... 53
53. Male with ventral pits; elytra with a broad black vitta on each, narrowed near  
 the middle.....*A. subtropicus*, new species  
 Male without ventral pits..... 54
54. Abdomen rufous ..... 55  
 Abdomen black, except the membranous portions..... 56
55. Head short, length-width ratio 0.76; elytra dull black, margins pale.....  
 .....*A. rufiventris* Horn  
 Head long, length-width ratio 1.17; elytra shining, aeneous black, margins pale  
 .....*A. santarosae*, new species
56. Pale color of head confined to clypeus; thorax mostly black; elytra vittate.....  
 .....*A. demissus* Fall  
 Pale color of head not confined to clypeus..... 57
57. Black disc of thorax lobulate, in three parallel, more or less confluent, spots or  
 stripes, the central longest.....*A. lobulatus* (Leconte)  
 Black disc of thorax, if present, not lobulate..... 58
58. Elytral margins narrow, not dilated.....*A. circumscriptus* (Say)  
 Sutural or lateral margin, or both, dilated..... 59
59. Larger, 3.5 mm..... 60  
 Smaller, 2.0-2.5 mm..... 61
60. Thorax pale, with central black stripe or spot; only the second antennal segment  
 pale; only the anterior tibiae pale.....*A. rufumarginatus* (Motschulsky)  
 Thorax black, with narrow basal and lateral margins pale; first two antennal  
 segments or more pale; first two pairs of legs more or less pale, especially the  
 femora .....*A. difficilis* (Leconte)
61. Sutural pale margins strongly dilated and depressed and usually not continuous  
 with pale apical margins; elytra thin, shining.....*A. texanus* Marshall  
 Sutural pale margins narrowly dilated and broadly continuous with apical mar-  
 gins; elytra normally thick and dull.....*A. minutus* Marshall

Of the 57 species and varieties included in the above key, 51 are before me. Of the remaining six, I have examined the types of three, *A. tuberculifrons*, *A. transmarinus*, and *A. dilutimargo*. In the case of the other three, *A. marginipennis*, *A. subfasciatus*, and *A. rostratus*, I have taken the characters made use of in the key from the original descriptions. No one could be more aware of the imperfections in the key than the author himself. Like most keys, it should be used merely as a guide and not to the exclusion of the original descriptions and of any other information that is available concerning the species in question. Such observations concerning the individual species as I think are worthy of reording will follow, the species being con-



sidered in the order in which they appear in the key. Incidentally, this order is merely one of convenience and is not intended to represent any opinion concerning the phylogenetic relationships of the species.

#### ***Attalus melanopterus* (Erichson)**

The only specimen of this species which was known to Horn (1872) had the "legs pale rufous, hind femora at the tip piceous." Five specimens are before me, all females, of which three have the legs colored as in Horn's specimen. One, from Ohio, has the legs all rufous and one, from Florida, has the legs all black, except the proximal ends of the anterior femora.

#### ***Attalus glabrellus* Fall**

Fall states, in his original description of this species: "Black, thorax typically with a rufous spot at the hind angles, varying to entirely black, or with the sides broadly rufous." In a series of 60 specimens, from various points in Southern California, Arizona (Santa Rita and Chiricahua mountains), and Texas (Davis and Chisos mountains), the thorax is entirely rufous in the majority of specimens. In some, there is a central black spot, usually placed near the anterior margin; others are colored as were Fall's specimens, but only three specimens out of the lot have the thorax entirely black. The legs are correspondingly paler than described by Fall. *Attalus lecontei* Champion, to which Fall compares *A. glabrellus*, appears to be much rarer and, in addition to the differences noted by Fall, is more elongate and has the elytra distinctly pubescent.

#### ***Attalus morulus* Leconte**

The type series of *A. morulus* was recently discussed by me, in the second number of these studies (1949). A subsequent personal examination of the holotype, at the Museum of Comparative Zoology, showed it to be identical with the form which I described in the same paper, under the name *A. smithi coloradensis*. According to the notes which I made at the Museum of Comparative Zoology, "the clypeus and labrum are piceous, genae and mandibles yellow, first two pairs of legs testaceous, hind femora piceous, the tibiae and tarsi piceotestaceous. The last sternite shows all the characters set forth in my key (1949) for *A. s. coloradensis*, with the notch slightly less than one-third the length of the segment." At the time Mr. Frost and Dr. Darlington made the comparison referred to (Marshall, 1949), they did not have examples of *A. s. coloradensis* at hand, as that had not yet been recognized as distinct from the form referred to as "Morulus I" in that paper.

*Attalus s. coloradensis* Marshall thus becomes a synonym of *A. morulus* and *A. smithi* Hopping a subspecies of *A. morulus*. *Attalus greeni* Marshall,

treated in the same group (Marshall, 1949), remains unaffected but the species there treated as *A. morulus* remains without a name and I propose for it the name *Attalus frosti*.

***Attalus frosti* Marshall, new species**

*Male.* The male was described in the paper referred to above (Marshall, 1949) as the allotype of *A. morulus* and the specimen so labeled becomes the holotype of *A. frosti*.

*Female.* Slightly more widened posteriorly than the male. Color uniform piceous-black, except for the abdominal segments, which are piceous and the anterior edge of the clypeus, the labrum, mandibles, under surface of first three antennal segments, and anterior tibiae and tarsi, which are picotestaceous. Pubescence and sculpturing as in the male. Antennae shorter, scarcely serrate, extending only two segments beyond the thoracic base. The pygidium has a small apical notch, as in the male. The last sternite is quite convex, moderately shining, rather densely, and finely punctured and covered with numerous long black hairs; the notch is about two-thirds the length of the segment and is narrowed caudally.

Length 2.8 mm. to tips of elytra.

Holotype, male, "Linwood, New Jersey VII-17-44" and allotype, female, "Mt. Pocono, Pennsylvania, VII-9-29", both collected by Mr. J. W. Green, are in the author's collection. Paratypes also in the collections of Mr. Green and Mr. Frost. Named in honor of Mr. C. A. Frost, in appreciation of his assistance in working out the relations of the group and of the many other favors he has shown me. The variation in the type series, which is very slight, is discussed in the paper already referred to.

The relations of the group may be summarized as follows:

- Attalus morulus* Leconte (*A. coloradensis* Marshall)
- subspecies *smithi* Hopping
- Attalus frosti* Marshall
- Attalus greeni* Marshall

***Attalus illinoisensis* Marshall, new species**

*Male.* Elongate oval, the elytra strongly widened posteriorly. Black, under surface of first two antennal segments and a small spot at each posterior thoracic angle picotestaceous; tibiae, tarsi, and abdominal segments piceous, the margins of the latter paler. *Head* short, triangular, inserted in the thorax to the eyes, length-width ratio 0.91, front with a shallow, but broad semicircular depression, the surface marked with fine cracks, which radiate upward and outward from the center of this depression. *Antennae* slender, scarcely serrate, passing the posterior thoracic margin by three

segments. *Prothorax* quadrate, 1.3 times wider than long, the sides slightly converging posteriorly, the angles all broadly rounded, the anterior margin slightly produced; surface shining, punctuation and pubescence very fine and inconspicuous. *Elytra* only moderately shining, suture depressed, punctuation and pale pubescence as on the thorax, a few erect black setae near the lateral and apical margins. Pygidium small, triangular, and narrowly truncate at the tip. *Under surface* and legs with punctuation and pubescence rather dense but fine and inconspicuous. The fourth abdominal segment has a transverse, thickened ridge which overhangs the retracted median portion of the posterior border and from the center of this border a small, pale, scale-like structure, as in *A. oregonensis*, projects down over the fifth segment, which has a pair of ventral pits near its posterior border. Lobes of second protarsal segments smaller than usual, narrow, reaching only about the middle of the third segment, the tips rounded and very narrowly edged with black.

*Female*. Similar to the male, except as follows. Antennae shorter, very slender and not at all serrate. Thorax with broad pale lateral margins, which narrowly join across the basal margin; pale margins of abdominal segments wider; last sternite broadly depressed in the center.

Length, male 2.0 mm., female 2.6 mm.

Holotype, male; and allotype, female, labeled "S. III. June. Bock. A. Fenyes collection," in collection of California Academy of Sciences.

Two male paratypes, same data, in author's collection. The paratypes both have the posterior thoracic angles broadly pale and the last two sternites entirely pale. No other noteworthy variations are present.

This species is the only one known to me in the genus which has both ventral pits and the ventral scale. It resembles certain specimens of both *A. pallifrons* and *A. otiosus*, but may be known from both of these species, in addition to the character just mentioned, by its smaller size, more widely dilated and more shining elytra and the absence of yellow markings on the front of the head and anterior two pairs of legs. The color of the thorax is obviously variable and unreliable.

#### ***Attalus lecontei* Champion**

Horn, in his 1872 key, states that this species has the "thorax with pale apical margin, apex of elytra bordered with testaceous," whereas in his discussion of the species he states that the base of the thorax is margined with yellow and that in the male the apex (of the elytra) and a small portion of the sides and suture are bordered with yellow. In the original description Leconte states that the thorax has the base flavo-emarginate. I have examined Leconte's unique female type, which agrees with the original description. The statement in Horn's key is clearly an error.

Horn was also in error in stating that the yellow markings at and near the elytral apices are a sexual character. I have males with all black elytra and females with the yellow markings, as well as specimens in which the opposite state of affairs prevails. It seems that the yellow markings are more prominent in certain localities; for instance, in a series of 16 specimens from Mecca, California, all but two of them show the yellow markings more or less well developed. The yellow or orange color typically forms an elongated triangular area, with the base at the elytral apices and the apex of the triangle at about the posterior third of the suture. In several of the specimens the yellow thoracic basal margin, which is usually white rather than yellow, includes the posterior angles and in a few extends up the sides to form broad yellow lateral margins. This species can be very troublesome in its identification, as shown by one well known collection in which the series labeled *A. lecontei* contains three specimens, one *A. futilis*, one *A. glabrellus*, and one *A. lobulatus*. The specimens with all black elytra can be easily confused with specimens of *A. futilis* or *A. glabrellus* that have the thorax with a yellow basal margin, as is not infrequently the case; but hardly with *A. lobulatus*. *Attalus glabrellus* and *A. futilis* are both larger species and are not so definitely dilated posteriorly as *A. lecontei*, although Horn definitely exaggerates when he states that *A. lecontei* (= *basalis*) is almost as broadly dilated as *A. granularis*. *Attalus futilis* is much more densely pubescent and *A. glabrellus* is more glabrous and more finely pubescent and the legs in both these species, when they become pale in part, do not have the banded appearance of the legs in *A. lecontei*. The females of *A. lecontei* can be easily separated from the other two species by the fact that the last sternite, which is long and triangular in shape, has a small acute notch at the rounded apex.

#### ***Attalus grisellus* Fall**

A series of 135 specimens, from the Badlands of South Dakota, is referred to this species and shows practically no variation, except in the color of the prothorax, which varies from all yellow to black with the posterior angles broadly yellow, the latter being the color in the type series of nine specimens. I have the same species, previously recorded only from the type locality in New Mexico, also from western and central Texas. Fall states that this is possibly "no more than a variety or race" of *A. futilis*. I have compared specimens of this species, as well as those of *A. futilis*, from Arizona, with Fall's types of *A. futilis* and his paratypes of *A. grisellus* (the type of *A. grisellus* is in the collection of the Philadelphia Academy of Sciences), but owing to lack of time, I made no close study of the abdominal segments. If my identification of these two species is correct, these structures show clearly that they are distinct species. In *A. grisellus*, the fourth segment has an oblique, hairy carina or ridge on each side, in the male, with a whitish seale-



like structure projecting from the middle of the posterior edge down over the fifth segment, much as in *A. oregonensis*. In some specimens these ridges are almost obsolete, while in others they form overhanging, posteriorly projecting lobes; the centrally placed scale-like structure appears to be constant. The pygidium is unusually small for the genus, and is almost triangular, with the tip narrowly rounded. In *A. futilis* there is no modification of the fourth segment, but the fifth segment has the posterior margin membranous, yellow, and broadly emarginate. The head in *A. grisellus* is also definitely longer than in *A. futilis*. Further opportunity to examine the types may show that we are dealing with a new species. Unfortunately, Fall makes no mention of the secondary sexual characters in his description of either *A. grisellus* or *A. futilis*.

A series of 134 specimens in the collection of Mr. J. W. Green, mostly from the Jemez Mountains, New Mexico, shows the same variation in the color of the prothorax as does the series from South Dakota, the color being entirely black in some specimens.

#### **Attalus futilis** Fall

In addition to the above remarks concerning this species, under *A. grisellus*, it is noted that Fall compares this species with *A. morulus*, from which it is abundantly distinct. It is much more apt to be confused with *A. lecontei*, which is less densely pubescent, more dilated behind and with the head definitely wider. The color differences as to the legs and the base of the thorax are not reliable.

#### **Attalus nigripes** Horn

In his original description of this species, Horn (1870) states: "body beneath and legs black" and in his 1872 key he repeats: "legs entirely black." These statements are correct so far as concerns the females, but most of the males have the anterior two pairs of legs yellow, except for the tarsi and knees, and the last three abdominal segments yellow in part. The males show a modification of the fourth and fifth sternites which is quite distinctive and which has not been previously noted, to my knowledge. The central third of the fourth segment is black and ends posteriorly in a roughened, elevated ridge that slightly overhangs the true posterior border of the segment. The remainder of the sternite is yellow, except for the anterior angles. The fifth segment presents a similar structure, but the ridge here does not reach the posterior edge of the segment, the black central area has a median carina and both ridge and posterior border of the segment have an acute median emargination. The terminal segment, both sternite and tergite, is larger and thicker than usual in the genus and the sternite is made up of two lateral, mandibuliform lobes, with concave median edges,

leaving an unusually large genital aperture. The fifth and sixth sternites, with the exception of the black median lobe of the fifth, are entirely yellow.

### ***Attalus semirubidus* Fall**

This species was described by Fall in 1917 from a unique male and, so far as I know, has not been mentioned since in the literature, except for its listing in Leng's catalogue. The type was from Mobile, Alabama. A series of 29 specimens, from various points in Mississippi: Lucedale, Leaf, Leakesville, Beaumont, North Augusta, and Green County, all collected by Dr. Henry Dietrich, enable me to record the extent of variation shown by the species.

Several of the males agree in every particular with Fall's description. They vary from 2.0 to 2.5 mm. in size. The females vary from 2.5 to 2.8 mm. About half the females have the abdominal segments spotted with black and, in one specimen, these segments are entirely black, with the posterior borders rufous. The following variations in color appear to be unrelated to sex. In most cases, the elytra are shining black, with a faint purplish tinge and the line of demarcation between the black elytral discs and the rufous apices is sharply defined; in a few the discs become piceous or rufopiceous in color, with a very poorly defined distinction between the discs and the apices. The rufous color of the apex may or may not extend around the lateral margins for a variable distance; in some cases the entire lateral margins are rufous. The pale color does not extend up the suture in any case. The head in several specimens is entirely rufous, with only a suspicion of a dark spot just inside the upper end of each eye. These spots become larger and blacker in most specimens and eventually coalesce to give a completely black occiput, as in the type. In a few specimens the black color then extends down onto the front for a variable distance and, in one female, the head is entirely black, with a yellow trilobed frontal area just above the clypeus. The legs are mostly as in the type, the femora rufous and the tibiae and tarsi dusky. In some specimens the distal ends of the posterior two pairs of femora are black and in a few the posterior pair of legs is entirely black.

### ***Attalus terminalis* (Erichson)**

Horn (1872) states that the tips of the male elytra and a narrow space along their sides, not attaining the humeri, are bordered with yellow. He makes no mention of the females, but neither does he state that all of his specimens were males. Blatchley (1910) makes the definite statement, which is an error, that the females are uniformly black above. Examination of a series of about 200 specimens, the majority of which are females, from New York, New Jersey, Maine, Massachusetts, Ontario, Maryland, Minnesota, Iowa, Pennsylvania, and Tennessee shows the following: most of the

males have the elytra colored as Horn states, but in some the narrow lateral bead is yellow as far as the humerus and in these cases all the legs are apt to be testaceous; most of the females have the elytral tips more narrowly yellow than the males and the pale color does not invade the lateral margin. Some females, however, have the elytra colored as in the average male and some males as in the average female. In only two females of the lot are the elytra uniformly black. In quite a few specimens the elytra are piceous, rather than black.

#### **Attalus serraticornis** Fall

One male, from Imperial County, California, which I refer to this species, does not have the metasternum or ventral segments black, as in the type and the antennal segments three to six are not quite as wide as long. It does have the last ventral segment more strongly produced and impressed, as described by Fall, than any other species with which I am familiar.

#### **Attalus humeralis** Leconte

This rare, but easily recognized, species was evidently known to both Leconte and Horn only from the unique type specimen, from Peoria, Illinois, and, to my knowledge, has not been mentioned in the American literature since. I have seen it in several collections, mostly uniques, including my own and all of the specimens, about half a dozen, have been from Brownsville, Texas. I am inclined to believe that the locality label on Leconte's type was an error.

#### **Attalus rufiventris** Horn

This species varies in its coloring to a greater extent than has been indicated by previous authors, so much so that the delimitation of the species and its satisfactory placement in any key become difficult matters. Even after we agree that Fall (1917) was correct in placing *A. paralellus* Horn as a synonym of *A. rufiventris*, the variation described by Horn (1872), in which the "occiput and narrow median thoracic stripe (are) black," by no means exhausts the possibilities. In a series of 90 specimens, from various points in Texas, southern New Mexico, southern Arizona, and southern California, only seven are typical *A. rufiventris*, with the thorax and head entirely red and these are all females. Of all the others which have the elytra typically colored, with only a narrow sutural margin and the apices red, 21 in number, represent Horn's "variety," noted above and are all males except one, showing that this variation is mainly sexual in character. In some the thoracic stripe is abbreviated, forming a median anterior thoracic spot. In many the black color of the occiput extends for a variable distance down the front, in some reaching the clypeal suture. In most of

those which have the lower portion of the front yellow, the pale color forms a transverse band above the elypeus, but in a few it forms a definitely trilobed frontal area, as in several other species. Ten of the specimens, from southern Texas and southern California, have the elytra quadrimaculate and are Horn's *A. paralellus*. The remaining specimens, which constitute the majority of the entire series, show all degrees of intermediate stages between the elytral coloring of the typical specimens and the quadrimaculate form. Some show an elytral pattern resembling *A. trimaculatus*, but these may be distinguished from *A. trimaculatus*, in addition to the short head, by the fact that the apical spots always attain the lateral elytral margins. In the southern Arizona specimens, twelve in number, from Tucson and Wickenburg, the basal portion of the pale sutural margin tends to become widely dilated, forming a red triangle whose sides extend from the elytral humeri to a point near the apex of the suture. In the extreme forms of this variation, the scutellum is also entirely pale. In a series of ten from southwestern New Mexico (Hidalgo County), the abdomen is more or less heavily maculate with black, in the majority being entirely black, with the borders of the segments pale, thus belying the specific name. A series of nineteen specimens from the Santa Rosa Mountains, in southern California, appear to be typical *A. rufiventris*, except for a strong tendency to the quadrimaculate form, eight of the ten of such forms mentioned above occurring in this series. The scutellum in all of these specimens, however, remains black, whereas in typical *A. paralellus*, from southern Texas, it is testaceous. Specimens of the quadrimaculate form, from Prescott, Arizona, received after the above notes were made and which are associated with typical *A. rufiventris*, have two black dots on the prothorax, of variable size, arranged as in *Collops bipunctatus*.

It is possible that I have included more than one species in this lot of material and, in fact, I have separated two forms from the original confused lot, presently to be described as new, largely on the basis of characteristic modifications of the genital segments. With these exceptions, however, intermediate examples appear to be present to connect all the extremes noted. It seems that this species is in a state of active evolutionary change at the present time and is splitting up into several derivative forms, which are not as yet sufficiently isolated or distinct to be defined as sub-species. I believe that we can best obtain a concept of such species by carefully noting the extent and the locale of the variations in such series as it has been my privilege to examine.

#### ***Attalus pettiti* Horn**

One specimen, a male, from Clear Lake, Wisconsin, has the apical black spot wanting, giving it a considerable resemblance to *A. humeralis*. The latter, however, is more dilated posteriorly in the same sex, more ovoid in



shape, with the elytra transversely impressed at the anterior third, more coarsely punctured and more densely pubescent. The metasternum in *A. humeralis* is pale, in *A. pettiti* black; the pygidium in *A. humeralis* is entire, in *A. pettiti* strongly notched at the apex.

***Attalus balteatus* Marshall, new species**

*Male.* Oblong, parallel, the elytra not widened posteriorly. Rufotestaceous; the scutellum, a pair of spots on each elytron, the metasternum, a pair of spots on each sternite, and the exposed tergites piceous. Upper surface strongly alutaceous, the elytra slightly less so than the head and thorax. *Head* short, oval, one-tenth wider than long, eyes small, tempora somewhat produced, front unimpressed, punctuation and pubescence extremely fine and sparse. *Antennae* short, extending beyond the posterior thoracic margin by not more than one segment, scarcely serrate, moderately pubescent. *Prothorax* transverse quadrate, 1.3 times wider than long, the sides slightly converging posteriorly, the apical margin slightly produced. Punctuation and pubescence as on the head. *Elytra* slightly lighter in color than cephalothorax, the piceous spots with a faint violaceous tinge, the basal spots extending entirely across the base and along the suture, but not involving the latter, the subapical spots larger, broadly involving the lateral margins, their inner edges tangential to the suture, the elytra apices pale. The elytra might with almost equal propriety be described as piceous, with a subbasal fascia and the apices pale. Punctuation fine and sparse, pubescence very fine and inconspicuous, the fairly numerous erect, black setae also observable only in a favorable light. Three tergites exposed beyond the elytra; the pygidium moderate in size, semicircular and evenly rounded. *Under surface* very finely punctured and pubescent, the abdominal segments with no distinctive modifications. Lobes of the second protarsal segments rather prominent, convex in cross section, dilated toward the ends and almost reaching the ends of the third segments, the tips narrowly black.

*Female.* Similar to the male, except as follows. Antennae shorter, about reaching the posterior thoracic margin, not perceptibly serrate; ventral segments entirely piceous, the last with the midline deeply impressed; elytra no more widened behind than in the male, three tergites exposed, pygidium truncate at the tip.

Length, male and female, 1.8 mm. to tips of elytra.

Holotype, male and allotype, female, labeled "**San Francisquito Bay, Gulf of Calif.** June 23, 1921. E. P. Van Duzee, collector." Holotype and allotype in the collection of the California Academy of Sciences.

Seven paratypes, one male and six females, six with the same data as the types, one "8 mi. N.E. Cape San Lucas, L. Cal. VII-10-38." Paratypes in the author's collection and in that of the California Academy of Sciences.

The paratypes are mostly lighter colored than the types, some of them at least from immaturity. In the male paratype, the basal elytral spots are reduced to two piceous streaks adjacent to the basal end of the suture and in some of the females these spots are practically absent. The female from Cape San Lucas is darker than the types, the parts described as rufo-testaceous in the types (except the elytra) being piceotestaceous.

The species does not appear to have any close relatives in our fauna. If it is regarded as fasciate, instead of spotted, which it might well be, it runs to *A. debilicornis* Champion in Champion's key (1914), which he described from a single male, from Guatemala. This species, however, has the upper surface shining and the elytra "much widened posteriorly," which characters separate it at once from *A. balteatus*.

#### ***Attalus tucsonensis* Marshall, new species**

*Male.* Oblong, slightly and gradually widened posteriorly. Color rufo-testaceous, an elongate spot on each elytron, the terminal seven antennal segments, the middle and posterior tarsi, tibiae and distal ends of femora, tip of the last sternite and tip of pygidium piceous. *Head* short, length-width ratio 0.92, front evenly convex, apparently impunctate, pubescence pale and so fine as to be visible only in an oblique view, a few erect black setae across the occiput. *Antennae* moderately serrate and pubescent, extending beyond the thoracic base by about three segments. *Prothorax* transversely oval, one-fourth wider than long, all the angles broadly rounded, surface and pubescence as on the head, the erect black setae concentrated near the anterior margin and the midline, inclined cephalad, an erect fringe of setae at the posterior angles. *Elytra* with an elongate piceous spot on each, drumstick-shaped, commencing at the humeral umbo and expanding in the posterior half, almost reaching the lateral margin, but distant from both the sutural and apical margins; the surface moderately shining, the punctuation and pale pubescence dense and extremely fine, the erect black setae uniformly scattered over the entire surface. *Under surface* very finely punctured and pubescent, the legs more distinctly so, a few erect black hairs on sternites three, four and five, more numerous on sternite six and the last two tergites. Pygidium quadrate, the sides converging posteriorly and slightly sinuate, the tip rounded-truncate. The last sternite consists of a pair of triangular lobes, extending about one-half the way to the end of the pygidium, the median edges concave, the tip terminating in a sharp hook, projecting mediad, resulting in a large oval opening, through which can be seen practically all of the ventral surface of the pygidium and the aedeagus. The lobes of the second protarsal segments are large, spatulate, the tips rounded and with a heavy black edge around the tip and about the terminal half of the median edge.

*Female.* Similar to the male, except that the antennae are shorter and

feebly serrate; the pygidium is of the same size and shape as that of the male, but there is a deep, parallel-sided notch, occupying about one-third the width of the pygidial tip and extending from the tip about one-third the distance to the base of the segment. The terminal sternite is as long as the pygidium and unmodified.

Length, male 3.7 mm., female 3.5 mm.

Holotype, male, "Tucson, Ariz. VIII-16-40, D. J. and J. N. Knull, collrs." and allotype, female, "Tucson, Ariz. VIII-13-36, J. N. Knull, collector," are the property of Ohio State University and will be returned to Dr. Knull at that institution.

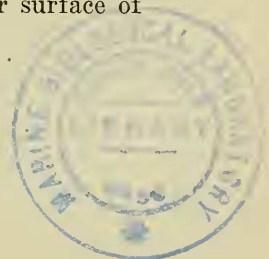
Fifteen paratypes, five male and ten female, from the following localities: ARIZONA: 2 Sabino Canyon, 2 Globe, 1 Canyon Lake, 1 Wickenburg, 1 Yuma. CALIFORNIA: 1 Palo Verde. MEXICO: 1 Guaymas, Sonora; 1 San Bernardo, Sonora; 2 San Carlos Bay, Lower California; 1 Tiburon Island, Gulf of California. Paratypes in the author's collection and in that of the California Academy of Sciences.

The series shows only a moderate amount of variation. In several specimens, of both sexes, epistoma and frontal margin are pale yellow, the margin in one male showing a trilobed posterior border. In some the basal portion of the elongated elytral spots is very faint, a black humeral spot at times remaining. In one female, the elytra are entirely pale, except for a moderate sized subapical spot. In most specimens the anterior legs are darker than in the types, being colored as are the posterior two pairs. Three males, from Wickenburg and Yuma, Arizona, and from Palo Verde, California, are smaller than the types, about 2.5 mm. and have the pygidium larger. These may represent a distinct species, but in the absence of corresponding females, which in this species display the most distinctive characteristic in the deep pygidial notch, they are provisionally assigned here.

The species would only be confused with the variant of *A. rufiventris* mentioned under the discussion of that species as occurring in southern Arizona. *Attalus rufiventris* is smaller than the types of *A. tucsonensis*, averaging about 3.0 mm., the last sternite of the male completely covers the ventral surface of the pygidium and is merely thickened in the areas represented by the lateral lobes in *A. tucsonensis*; the pygidium of the female is squarely truncate, as in the male, with no notch at the tip. After setting aside the pair of *A. tucsonensis* to be described as new, I was interested to observe that Professor Fall had set aside an identical pair in his collection, at the Museum of Comparative Zoology, obviously for the same purpose.

***Attalus tucsonensis sanctus* Marshall, new subspecies**

*Male.* Size, shape, sculpturation, and pubescence as in *A. tucsonensis*. Upper surface entirely rufotestaceous; antennae, except under surface of



first three segments, tibiae, tarsi, and distal ends of femora piceous. The tooth at the base of the aedeagus is large, laterally compressed, the posterior edge vertical, the anterior edge oblique. Other characters as in *A. tucsonensis*.

*Female.* Similar to the male except for the secondary sexual characters. The pygidium is narrower than in typical *A. tucsonensis* and the pygidial notch, which is the most obvious distinguishing character of the species, is much deeper, extending about three-fourths the distance to the base of the segment and is widened in its anterior portion.

Length, male and female 4.0 mm.

Holotype, male and allotype, female, "**Espirito Santo Island, Gulf of Calif.**, June 9, 1921. E. P. Van Duzee collector." Holotype and allotype in the collection of the California Academy of Sciences.

Nineteen paratypes, six males and thirteen females, fourteen with the same data as the types, three from Concepcion Bay, Lower California, one "10 mi. E. San Ignacio, L. Cal.," one Ceralbo Island, Gulf of California. Paratypes in the author's collection and in that of the California Academy of Sciences.

This form appears to meet the criteria for designating it as a subspecies of *A. tucsonensis*, since neither occurs, so far as known, in the territory of the other subspecies and the specimens from intervening localities show characters intermediate between the two. The male specimen from Ceralbo Island, which is adjacent to Espirito Santo, is similar to the holotype in every respect, whereas those from Concepcion Bay and San Ignacio, about 200 miles to the north, all show a piceous humeral spot and a similarly colored subapical spot of variable size. The three females from this area also have the pygidial incisure intermediate in depth, occupying about one-half the length of the segment.

#### ***Attalus sulphureus* Marshall, new species**

*Male.* Elongate-oblong, parallel, the elytra scarcely widened behind. Color pale sulphur yellow, the thoracic disc, most of the head, antennae and legs slightly darker, a pale testaceous, the palpi and middle and posterior tibiae and tarsi piceotestaceous. *Head* short, length-width ratio 0.90, front with a pale, trilobed, ivory-colored border, the middle lobe reaching the middle of the eyes, the lateral lobes reaching the posterior ends of the eyes, surface shining, evenly convex, sparsely and minutely punctulate and pubescent, a few erect black setae on the tempora behind the eyes. *Antennae* very feebly serrate, moderately pubescent, the terminal nine segments missing from the right antenna, the terminal five segments from the left. *Prothorax* transversely oval, 1.25 times wider than long, all the angles rounded, but more definite than usual in the genus, the anterior margin also projecting forward to an unusual extent, the disc marked by three longitudinal,



parallel, faintly piceous lines. Punctuation and pubescence inconspicuous, as on the head, a very few erect black setae in the neighborhood of the posterior angles. *Elytra* shining, punctuation and pubescence very minute, sparse and faint, a few black setae along the basal, lateral, and apical margins. Two and one-half tergites are exposed beyond the elytral tips, the same color as the elytra, with more numerous black setae; pygidium small, the sides strongly converging posteriorly, the tip evenly rounded.

*Under surface* sparsely punctulate and pubescent, the tibiae and tarsi slightly more so; abdominal segments, except the sixth, unmodified; this consists of two rounded lobes, which leave almost one-half the ventral surface of the pygidium exposed. Lobe of second protarsal segment moderate in size, slightly widened distally, the tip rounded and with a black margin.

*Female.* Similar to the male, except slightly darker; the antennae and all the tibiae and tarsi are piceous; antennae short, barely reaching the thoracic base and scarcely serrate; three and one-half tergites are exposed beyond the elytral tips and the abdomen is strongly narrowed; pygidium elongate, the sides slightly arcuate, the tip rounded-truncate; last sternite convex, unmodified and accurately covering the ventral surface of the pygidium.

Length, to elytral tips, male and female, 1.8 mm.

Described from a series of one male and three females. Holotype, male and allotype, female, "Ariz. Ac. 5409. Coll. Chas. Palm." One paratype same data and one labeled "Prescott, Ariz., Ex-Coll. W. T. Davis." It is believed that the Palm collection is now the property of the American Museum of Natural History. If so, the holotype and allotype will be deposited in that museum. The two female paratypes are retained in the author's collection.

One of the paratypes is slightly darker than the allotype and both have four entire tergites exposed. No other noteworthy variations are observed. Four specimens from the Hopping collection, all in very poor condition, are also referred to this species. They show no variation of any consequence.

The species, because of its small size and pale color, might be confused with *A. o. rubyae*. The latter is darker, much more conspicuously pubescent, the head longer and has the characteristic modification of the male abdominal segments mentioned in the key.

#### **Attalus oregonensis** Horn

A series of about 200 specimens, from Prescott, Arizona, of which over 80 percent are females, displays a range of variation in this species which has not been previously recorded. The relative length of the head shows considerable variation, the males tending definitely to have shorter heads than the females. Horn describes the head as "black, anterior margin of the



front rufous." This is the case in many specimens, but the majority have about the anterior one-half of the head rufous, while in some the red color extends up through the central portion of the occiput, leaving only a black spot over each eye and in a very few the head is entirely rufous. As to the thorax, which Horn describes as "varying in color from rufous with median black space to nearly black with margins and basal angles narrowly rufous," about 20 percent have the thorax entirely rufous, while in the majority there is an elongate central black spot of varying size, which at times attains the anterior, but never the posterior, thoracic margin and, in a few specimens, becomes broad enough to occupy the central half of the thoracic width. In another series, from the Santa Rosa Mountains, California, several specimens have the head and thorax entirely black. The abdomen in all the males is "pale yellowish," as stated by Horn, but varies in the females from all yellow, even including the usually black sixth sternite, through a maculate condition to all black. The metasternum, in most specimens black, likewise varies, through various shades of piceous and piceotestaceous, to yellow. The males have a very distinctive modification of the fifth sternite, the posterior border of which is split transversely, to form a shallow depression or pit, the anterior margin of which is obsolete except near the lateral angles and most of the remainder of the segment is occupied by two large, smooth, black depressions, one on each side, which are overhung by the posterior border of the fourth segment. A small, rounded, white, scale-like structure extends caudad from beneath the center of the margin of the fourth segment about as far as the middle of the fifth. This structure, first discovered in *A. oregonensis*, was at first mistaken for a grain of sand, but it proved to be constant in all males and refused to be removed with the point of a fine needle.

Another lot of unnamed *Attalus*, from Lower California, received from the California Academy of Sciences, contains 103 specimens of this species, from 18 different localities, scattered almost throughout the length of the peninsula, both in the interior and along both coasts and including several islands, such as Cedros Island in the Pacific and Tiburon Island, across the Gulf of California, adjacent to the mainland of Sonora. The locality farthest south is Espiritu Santo Island, near LaPaz. This series shows a bewildering amount of variation, rivaling *A. rufiventris* in this respect. In general, those occurring along the West Coast tend to become darker, while those on the East or Gulf Coast are lighter in color than typical *A. oregonensis*. The latter contain specimens of the small, all pale variety presently to be described as *A. oregonensis rubyae*, as well as those in which the only dark markings are a pair of large subapical spots. The scutellum in these may be pale or dark, with or without a pair of black juxtascutellar spots, which in some specimens spread across the elytral base. In others, the scutellum and a pair of humeral spots are black. A series of 19 specimens

from Cedros Island are quite uniform in color and are all black, except for narrow elytral margins (excepting the basal), a portion of the genae external to the antennal fossae and the membranous portions of the abdominal segments, which are rufous. Another series of 18 specimens, from Magdalena Bay, are all entirely black, except for the membranous margins of the abdominal segments and have the pubescence unusually dense and silvery. Fortunately, all of these forms contain males, which show the peculiar, characteristic modification of the fourth and fifth sternites. The variation in size is also considerable, from 1.7 to 3.0 mm.

***Attalus oregonensis rubyae* Marshall, new variety**

*Male.* Elongate-oblong, testaceous throughout, except for palpi and antennae, which are piceous (excepting the three basal antennal segments), the elytra and abdomen slightly paler than the head and thorax, the sterna and legs slightly darker. *Head* slightly elongate, length-width ratio 1.09, feebly impressed between the eyes, the center of the labrum with a piceous spot; surface shining, very finely punctulate and with fine, pale, decumbent pubescence. *Antennae* extending one segment beyond the base of the prothorax, feebly serrate, moderately pubescent. *Prothorax* quadrate, one-fifth wider than long, the sides slightly convergent posteriorly, all the angles broadly rounded, base and posterior angles moderately reflexed, punctuation and pubescence as on the head. *Elytra* not shining, finely and densely punctate, the pubescence fine, pale and decumbent, producing a silky appearance, the erect black setae numerous and uniformly distributed, the pubescence so arranged as to give the impression that the elytra are finely granulate. *Under surface* finely and densely punctulate and pubescent. The fourth segment has an oblique thickened ridge on each side and a white scale-like structure projecting from the midpoint of the posterior margin, as in *A. oregonensis*; the basal portion of the fifth segment is impressed and darker colored on each side of the midline; the sixth segment is divided into two lateral triangular lobes; the pygidium is small, with sides strongly converging and apex evenly rounded and entire. The lobes of the second protarsal segments are slender, slightly dilated and rounded at the tips, the margins narrowly black.

*Female.* Similar to the male, except as follows. Antennae about the same length and very feebly serrate; each elytron has an ill-defined subapical piceous spot. Head and sternum darker than in the male, piceotestaceous; pygidium slightly longer than in the male; last sternite unmodified.

Length, male 2.2 mm., female 2.3 mm.

Holotype, male and allotype, female, "Lowell Ranger Station, Pima Co., Ariz., July 6-20, 1916," collector unknown, in the author's collection.

Fourteen paratypes, 2 males, 12 females, one with the same data as the types, nine labeled "Inyo Mts., Calif., July 7-11," four "Mtn. Springs, Calif., VIII-23-24." Paratypes in the author's collection and in that of the California Academy of Sciences.

This small, pale form was at first described as a new species, which accounts for the amount of detail in the description, but the receipt of 13 additional specimens, which I have labeled as paratypes, from the California Academy of Sciences, together with their entire collection of *Attalus*, made the retention of the form as a distinct species untenable, since the paratypes showed a definite trend in coloration toward typical *A. oregonensis* and were also intermediate in such other characters as I had used to separate the "species" from *A. oregonensis*, such as the degree of serration of the antennae, the shining surface of the elytra and the density of pubescence.

The peculiar scale-like structure mentioned, on the fourth sternite, is known to me otherwise only in *A. oregonensis*, *A. illinoisensis* and in the species that I identify as *A. grisellus*, which latter two are separated at once by their constant color differences. Six of the paratypes are from the Hopping collection and came originally from the C. W. Leng collection. This series was labeled, apparently by Mr. Leng, "*Attalus* n. sp." I do not feel justified in calling the present form a subspecies, since typical *A. oregonensis* also occurs in the same locality as the type series.

The form is named in honor of my wife, who has been my companion on many collecting trips and who has put up with my "beetleing" for the past twenty years and more.

#### ***Attalus rostratus* Horn**

This species has been included in the key, until such time as I am able to examine Horn's unique female type. Fall (1917) considered it "more than likely that the male will show this to be a *Tanaops*." Two female specimens in my collection, which I obtained several years ago under the name *A. rostratus*, from the Los Angeles Museum, proved to belong to *Tanaops neglectus* Marshall (1946) and two females in Mr. Frost's collection, one identified by F. Blanchard and one by Chas. Dury are, respectively, females of *T. neglectus* and *T. greeni* Marshall (1944).

#### ***Attalus diffusus* Marshall, new species**

*Male*. Elongate-oblong, very slightly widened posteriorly. Blackish piceous, lateral and apical elytral margins diffusely paler, prothorax, anterior two pairs of coxae and trochanters and the entire abdomen rufotestaceous. *Head* short, eyes prominent, length-width ratio 0.92, front bi-impressed, surface shining, very finely and sparsely punctured and pubescent, more

densely so in the impressed areas. *Antennae* long, reaching about the middle of the elytra, feebly serrate, moderately pubescent. *Prothorax* transversely oval, one-fifth wider than long, the angles all strongly rounded, surface shining, punctuation and pubescence as on the head, with a scattering of erect, anteriorly inclined, black setae. *Elytra* minutely tuberculate, with a peculiar greasy luster, which is both alutaceous and sericeus, the tips separately rounded, the pale decumbent pubescence very dense, the erect black setae numerous and evenly distributed. Pale lateral margins very narrow, except where slightly dilated just anterior to the middle; pale apical margins wider. Pygidium exposed between the elytral tips, small, the sides straight and converging posteriorly, the apex truncate and shallowly emarginate. *Under surface* densely and finely punctate and pubescent, the fifth sternite broadly impressed and shining each side of the midline, the sixth consisting of two small rounded lateral lobes, which leave about half of the ventral surface of the pygidium exposed. Lobes of the second pro-tarsal segments long, completely covering the third segments, with the tips narrowly rounded and margined with black.

*Female*. Similar to the male, except as follows. Proportionately broader, the elytra more evenly convex and slightly more widened posteriorly; the diffusely pale apical margin very narrow; antennae shorter, passing the posterior thoracic margin by not more than one segment and very feebly serrate; abdominal segments black, except for the membranous portions and margins, which are rufopiceous; the last sternite concave and longitudinally impressed in the midline; the pygidium larger than in the male, with the tip more rounded and more acutely notched.

Length, male 2.0 mm., female 2.5 mm.

Holotype, male, "Dragoon Mts., Ariz., IX-10-47. D. J. and J. N. Knoll, collectors" and allotype, female, "Douglas, Ariz., VIII-11-40. E. S. Ross, collector." Holotype in collection of Ohio State University, allotype in that of the California Academy of Sciences.

Originally described from the unique male holotype and later 30 specimens, 10 males and 20 females, were received from the California Academy of Sciences. In addition to the allotype, these 29 paratypes are from Douglas, Tueson, Patagonia, and Huachuea mountains, Arizona, and from Guaymas, Sonora, Mexico. Paratypes in the author's collection and in those of the institutions just mentioned.

The series shows considerable variation. In some males, the labrum, clypeus, genae, mesosternum, and proximal half of the femora are testaceous, as well as the parts mentioned in the type, while in others of the same sex the abdominal segments are indistinctly maculate with piceous and the pale margins are reduced to the condition seen in most females. In four males and two females the pronotum is black, with broad lateral and posterior



margins testaceous. The females run darker than the males and in most of them the pale elytral margins are reduced to the anterior half of the lateral margins. The abdominal segments are black, as in the allotype, in all but two of the female paratypes. In one of the males, the suture is narrowly pale in the posterior half and in another an indistinct, piceotestaceous transverse fascia occupies the middle third of the elytra.

The species is apparently allied to *A. dilutimargo* Fall, especially in the diffuse blending of the elytral margins and disc and the small size. *Attalus dilutimargo*, however, has the sutural margins of the elytra pale and the tips not pale, whereas the opposite is present in *A. diffusus*. It also appears to be related to *A. opacipennis* Champion (1914), described from a unique female from an unknown locality in Mexico. *Attalus opacipennis* is said to have the elytra entirely black and the thorax, as well as the elytra, "densely alutaceous." In none of the specimens of *A. diffusus* are the elytra entirely black and the thorax is shining. *Attalus opacipennis* is also larger, 3.0 mm.

#### **Attalus circumscriptus Say**

Neither Say (1823), in his original description of this species, nor Horn (1872) nor Blatchley (1910), in their subsequent descriptions, gave any indication of the considerable variation in size or the differences in color associated with sex. These authors evidently drew their descriptions from the female, as they state that the head is black, with only the epistoma testaceous. The males have the yellow trilobed frontal area which is seen in the males of several other species of the genus. The legs in the females are about as described by Horn, with the hind pair piceous, but in the males all the legs are yellow. The males vary in size from 2.0 to 3.0 mm. and the females from 2.5 to 3.75 mm.

#### **Attalus lobulatus Leconte and Attalus difficilis Leconte**

There are several minute species in the *A. difficilis-lobulatus* group to be worked out. In most of the collections that I have examined, I believe that these two species are usually misidentified. *Attalus difficilis*, according to both Leconte and Horn, is about 3.5 mm. in length, but the species that I have seen commonly bearing that name, mostly from Utah, is a species about half that length. The form that is usually taken for *A. lobulatus* is, I believe, the one that was mentioned by Leconte as a variety of that species, common throughout southern California, but which I believe to be distinct. I have recently been able to compare specimens from Congress Junction, Arizona and from Yuma, Arizona, with Leconte's types of *A. difficilis* and *A. lobulatus*, respectively and found them to be identical. The type of *A. difficilis* is a female. The type series contains four specimens, the other three of which belong to a different species. The type of *A. lobulatus* is pale,



with a trilobed black spot on the thorax. Still another closely related species, with entirely pale head, thorax and underparts, occurs in the mountains near Globe, Arizona. Since all of my specimens of Leconte's "*lobulatus* variety" are females, I will not describe that form at the present time, but will describe the form just mentioned as "mostly from Utah," under the name *A. utahensis*.

***Attalus utahensis* Marshall, new species**

*Male.* Elongate oblong, slightly widened posteriorly. Color piceous; head, thorax and basal fourth of elytra blackish: clypeolabral membrane, membranous central portion, and posterior margins of abdominal segments whitish; under surface of first five antennal segments, genae, mandibles, narrow basal margin, and posterior angles of thorax, and entire narrow elytral margins testaceous; tibiae, tarsi, and anterior two pairs of trochanters piecotestaceous. *Head* short, length-width ratio 0.91, anterior half of the front distinctly bi-impressed, with a faint rounded impression midway between the eyes; surface moderately shining, minutely punctulate and with fine, pale pubescence. *Antennae* feebly serrate, moderately pubescent, passing the thoracic base by about three segments. *Prothorax* quadrate, one-tenth wider than long, the sides slightly converging posteriorly, all the angles rounded; surface unusually convex, the anterior margin prominent and arcuately produced: punctuation and pubescence as on the head. *Elytra* with narrow, uniform, sutural, apical and lateral margins testaceous, the sutural margin reaching the scutellum; surface shining, very slightly roughened, the punctures sparse and minute, the pubescence sparse and pale, with a few inconspicuous longer erect hairs along the lateral margins. *Ventral surface* sparsely pubescent, the legs somewhat more so. Lobes of second protarsal segments covering about one-half the third, the ends rounded, broadened distally, the margins narrowly black. Pygidium triangular, the sides almost straight, meeting at the tip in an acute angle. Last ventral segment divided into two oblique corneous lobes, the posterior edge of the fifth segment deeply and angularly emarginate.

*Female.* Similar to the male in form, color and surface sculpture. Antennae shorter, scarcely serrate, passing the thoracic base by two segments. Pygidium parabolic, the tip rounded; last sternite with a deep longitudinal impression occupying the entire central third of the segment, the bottom of the impression smooth and impunctate.

Length, male and female, 2.0 mm.

Holotype, male and allotype, female, "Beav. Crk. Hills, Beaver Co., Utah"—no dates or collector's labels—in the author's collection. Paratypes are in the author's collection and in that of the California Academy of Sciences.

Described from a series of 15 specimens, 6 males and 9 females; 3 collected at the above locality, 4 from "Nephi, Utah," 2 from "Ogden, Utah," and one each from "Deer Creek, Provo Can., Utah," "Cedar City, Utah," "Wendover, Utah," "Mt. Home, Idaho," "Tucson, Ariz.," and "Esmeralda Co., Nev."

The variation shown in the series is small. In several, the pale posterior margin becomes so narrow as to be almost invisible. The pale sutural elytral margin is very slightly dilated at times and does not quite reach the scutellum. In the male from Tucson, which may be distinct, three tergites are exposed beyond the elytra and the pygidium has the tip truncate.

This species must be separated from *A. difficilis*, *A. lobulatus*, and *A. texanus*. *Attalus difficilis*, under which name the species now stands in the collection of the U. S. National Museum, is a larger species, 3.5 mm. long, the pale sutural margins of the elytra are strongly dilated, the elytral apices broadly pale, the entire lateral thoracic margins pale, the posterior angles broadly so, the anterior half of the head, anterior two pairs of coxae and femora, and the pro- and mesosterna are yellow and the last sternite of the female is unmodified. *Attalus texanus* is about the same size as *A. utahensis*, at least in the male, but also has practically the same distinguishing points as *A. difficilis*, except that the thorax is pale, with a median black stripe; the head of the female is black, that of the male is yellow anteriorly, with a trilobed pale frontal area. Typical *A. lobulatus* is a pale species (Leconte says "flavus" in the original description), with a trilobed discal black spot on the prothorax. The dark variety mentioned by Leconte resembles the present species more than any other and may possibly bear a subspecific relation to it. All the specimens that I have seen, possibly a dozen, have been females, as are the four in my collection from Bailey's Well, San Diego County, California. In all of these, the pale sutural margins of the elytra are strongly dilated and depressed, the depressed area evenly rounded anteriorly and not extending any farther forward than the anterior fourth of the elytra. The depression on the last sternite is shallow and rounded.

#### ***Attalus cinctus* Leconte**

Typical *A. cinctus*, as shown by specimens in my collection which I have compared with Leconte's type, has the thorax black, with the entire elytral margin, including the base, narrowly yellow. The thorax may have a very narrow entire yellow margin or this may be confined to the base, as stated by Horn (1872). A female, in my collection, from Prescott, Arizona, has the thorax rufous, with three black discal spots and the head entirely pale, except for a slight darkening of the occiput; one, also a female, in the collection of Mr. J. W. Green, has the head and thorax entirely pale. In both specimens there is a considerable widening of the pale sutural margin an-

teriorly. These specimens closely resemble, so far as color is concerned, certain specimens of *A. rufiventris*, but may be easily distinguished by the much larger pygidium in *A. cinctus*, in both sexes. They also resemble *A. tucsonensis*, but lack the deep pygidial notch of the female of that species.

### *Attalus scincetus* Say

The black dorsal thoracic spot or stripe, as it has been variously designated, becomes widened in many specimens and in a few (approximately 10 percent in a series of 50 specimens before me) comes to occupy the entire thorax, with the exception of the posterior angles. In one specimen, even these are black. In such cases, the black color of the occiput extends down the head for a variable distance, at times as far as the lower border of the eyes, and the abdominal segments and femora become piceous. Most, but not all, of these dark specimens are females. All degrees of intermediate stages of both Motschulsky's variety "*infuscatus*" and Blatchley's variety "*confusus*" occur and it is not thought that either of these names is entitled to varietal rank, strictly speaking. However, the concept of a variety is less well defined than that of a subspecies, there being almost as many concepts of what constitutes a variety as there are writers on the subject. Some taxonomists have even gone so far as to suggest that the category be abandoned altogether. It appears that its claim to survival rests not so much on its scientific accuracy as on its practical usefulness in giving us a short, convenient method of referring to things which would otherwise require more or less circumlocution. The average coleopterist would like to be able to identify at least the bulk of the material in his collection without the necessity of sending his specimens to a specialist and if marked variations from the usual appearance of a species, which are apt to lead him astray in his attempts at identification, can be given a name, they can be more easily incorporated into keys and thus called to his attention. *Attalus s. confusus* Blatchley, which is certainly well named, offers an excellent illustration of the point I am trying to make. I have seen scarcely a collection in which one or more specimens of this so-called variety were not set aside in the unidentified material and, I may as well confess, I was in the process of describing one unusually dark specimen as new, when it suddenly dawned on me what I was dealing with. Blatchley (1910) gives very little idea of the extent of variation shown when he defines his "*confusus*" as "a color variety of *scincetus* in which the elytra, except the tips, are wholly piceous black and the median black stripe of thorax usually a little broader." In the specimen referred to, the entire thorax and elytra are black, except for the merest suggestion of a yellow margin at the posterior thoracic angles. The color pattern of the head is also very unusual, two diverging finger-shaped piceous areas extending down into the yellow portion of the lower

front. Specimens occur, at Dunedin, Florida, which are entirely pale, except that the usual black thoracic stripe is outlined by a piecous rectangle, pale in the center.

#### **Attalus trimaculatus** Motschulsky

This species approaches *Tanaops* in characters other than that of the elongate head. The second protarsal segment in the male, while it projects over the third, does not cover more than one-half the latter segment and does not show the sharply defined, black edge at the tip so common in *Attalus*. The fifth abdominal segment has an impressed groove just anterior to the posterior margin, both borders of the groove acutely angulated anteriorly at the midline and the fourth segment has a similar, though fainter, groove, evidently the homologue of the ventral pits seen in the males of *Tanaops*. A pair from Redlands, California, appear to possess all the characters of the above species, except that the male has a different type of modification of the 5th sternite, of which the posterior margin is markedly thickened and bristly in the lateral thirds, with the remainder of the segment deeply and transversely excavated. This is evidently a distinct species, but one cannot be certain, without examining Motschulsky's and Horn's types of *A. trimaculatus* and *A. elegans*, which of them is *A. trimaculatus* or whether one is *A. trimaculatus* and the other *A. elegans*, which Horn (1872) placed as a synonym of *A. trimaculatus*.

#### **Attalus subtropicus** Marshall, new species

*Male*. Elongate-oblong, scarcely widened behind. Color testaceous, the head posterior to a line connecting the center of the eyes, upper surface of the antennal segments, a broad median thoracic stripe, a broad vitta on each elytron, palpi, metasternum, a pair of lateral spots on each of the first two abdominal segments, and the last two tergites (except for the lateral margins) piecous; the labrum, tibiae, tarsi, and distal end of the femora piecetestaceous. *Head* slightly elongate, the length-width ratio 1.19, front practically flat, a small foveiform impression between the eyes; surface shining, finely punctulate and with fine pale pubescence. *Antennae* short for the genus, not passing the thorax by more than two segments, moderately serrate and pubescent. *Prothorax* almost circular in outline, viewed from directly above, 1.15 times wider than long; surface and pubescence as in the head, with a very few scattered erect setae. *Elytra* practically parallel, the piecous vittae narrowed from both sides just anterior to the middle, not quite reaching the lateral margin posteriorly and more remote from the sutural and apical margins; surface shining, finely and rather densely punctulate, the pale pubescence fine, semierect and inconspicuous, no erect setae clearly distinguishable from the balance of the pubescence. Last two tergites ex-



posed beyond the elytra, the pygidium acutely and angularly emarginate at the tip. *Under surface* finely punctured and pubescent, the abdomen unusually long and narrow, practically cylindrical beyond the third segment. The fifth sternite has a pair of very deep, transverse pits, narrowly separated in the midline and extending to the extreme lateral margin, the upper edge sharp and overhanging; the sixth is composed of a pair of lateral lobes, which leave about half the ventral surface of the pygidium exposed. The lobes of the second protarsal segments are obliquely narrowed toward the tips, which are very narrowly margined with black.

*Female.* Similar to the male, except that the antennae are very short, scarcely reaching the thoracic base, feebly serrate; all the legs and the sides of all the abdominal segments are picotestaceous. The pygidium is more pointed than in the male, but has a similar apical notch; the last sternite is flatter than usual, impressed in the midline and thickened along each lateral margin.

Length, male and female, 2.7 mm. to tips of elytra.

Holotype, male, "Brownsville, Texas, V-26-03" and allotype, female, "Esperanza Reh., Brownsville, Tex. V-25-03"—no collector's label on either specimen—in the author's collection.

Two paratypes, one male, one female, same data as allotype, in collection of Mr. C. A. Frost.

Three of the above four specimens, from Mr. Frost's collection, were labeled "Horn's rufiventris var.?, Vidit H. C. Fall, 1936." The species resembles the variety of "*rufiventris*" mentioned by Horn (1872) with respect to its color, but may be distinguished at once by the prominent abdominal pits of the male and the pointed, acutely notched pygidium of the female. The paratypes do not show any variation of consequence.

#### ***Attalus santarosae* Marshall, new species**

*Male.* Elongate-oblong, very slightly widened posteriorly. Black, the anterior half of the head, thorax, elytral margins, and most of the ventral surface rufotestaceous. *Head* long, length-width ratio 1.17, rufous anterior to a line connecting the center of the eyes. The line of demarcation is posteriorly arcuate and from its central portion a small reddish triangle extends up into the black area. Lower portion of front and clypeus very shining and glabrous, the remainder less shining, minutely punctulate and with fine, sparse, decumbent, pale pubescence; front flat, unimpressed. *Antennae* moderate in length, passing the thoracic base by about two segments, feebly serrate, moderately pubescent, the ventral surface of the first three segments testaceous. *Prothorax* quadrate, one-tenth wider than long, the sides slightly converging posteriorly, the angles all broadly rounded, the posterior slightly reflexed; surface shining and glabrous, the prostrate pubescence so fine as

to be almost invisible, a moderate number of conspicuous, erect, black setae uniformly distributed over the surface. *Elytra* black with an aeneous tinge, the entire lateral, apical, and sutural margins testaceous, the lateral and sutural slightly dilated just anterior to the middle, apices separately rounded, surface shining, punctuation distinct, fine and moderately dense, pale prostrate pubescence fine and inconspicuous. The evenly distributed, numerous, erect, black setae, however, are conspicuous and produce a bristling appearance. Pygidium moderate in size, strongly converging posteriorly, the tip truncate, entire. *Under surface* uniformly rufotestaceous, except the outer half of the metepisterna, the tibiae and tarsi and the distal ends of the femora, which are piceous; finely punctate and pubescent, the fourth and fifth sternites glabrous and shining and each with a pair of small, poorly defined pits at the posterior margins, the sixth consisting of a pair of short rounded lateral lobes. Lobes of the second protarsal segments long, narrow, tapered to a sharp point at the apices and without the usual black margin.

*Female.* Similar to the male, except as follows. Antennae slightly shorter and more feebly serrate; lateral and sutural margins of elytra less definitely dilated before the middle, almost uniform in width; head black almost as far anteriorly as the clypeal suture; last sternite piceous and unmodified, slightly shorter than the pygidium, which, together with the central third of the propygidium, is piceous and resembles that of the male in shape and size.

Length, male 2.7 mm., female 2.9 mm.

Holotype, male and allotype, female, "Santa Rosa Mts., Cal., VI-15-46. D. J. and J. N. Knull, Collrs." The types are the property of Ohio State University and will be deposited in that institution.

Described from a series of 16 specimens, 11 males and 5 females, 8 with the same data as the types, 8 collected by Dr. W. F. Barr at Piñon Flat, San Jacinto Mountains, California. In addition, there are some eight or ten specimens of the same series that I returned to Ohio State University some time ago determined as *A. rufomarginatus* Motschulsky. These may also be considered as paratypes. Paratypes are retained in the author's collection and in that of Dr. Barr.

Several of the paratypes have a nubilous piceous spot on the anterior portion of the thoracic disc and in several the greater part of the femora is piceous, especially along the dorsal edges. In one male the central portions of the pygidium and propygidium are piceous. The palpi are uniformly piceous. In some of the females, the piceous color of the last sternite is confined to the apical half. The females, in general, tend to be darker than the males, although in some the color pattern of the head resembles that in the males. In one female a central narrow longitudinal piceous stripe runs from the tip of the labrum past the anterior border of the eyes.

As already indicated, at one time, before I had obtained Motschulsky's (1859) paper in which he described and figured *A. rufomarginatus*, I identified the present species as such, partly by exclusion and partly from the fact that I had seen specimens of the species so identified by Professor Fall. Reference to the original description of *A. rufomarginatus*, quoted below, will show that that species is larger, has the thorax black with broad lateral pale margins, the abdominal segments black with the margins rufescent, front transversely impressed, and the elytra impunctate. I do not attach much weight to the color differences, but no one could possibly describe the elytra of the present species as impunctate, as the punctures are numerous and clearly discernible even with an ordinary 14 X hand lens.

### ***Attalus rufomarginatus* Motschulsky**

This species has never been definitely identified in this country since Motschulsky (1859) described it. I know of only two references to it in our literature. Horn (1872) omitted the species from his key, merely stating that it resembled *Tanaops abdominalis*. In 1917, Fall stated that specimens identified by Horn, both in the Leconte collection and in his own, were *T. abdominalis*. He stated further that from Motschulsky's description there could be no doubt that "*rufomarginatus*" was a true *Attalus*. I am unable to follow his reasoning here, since Motschulsky definitely describes a female and makes no mention whatever of the male. It is true that in his description of the genus *Scalopterus*, in which he placed "*rufomarginatus*," he states that the second segment of the anterior tarsus is prolonged into a hook ("crochet"), which covers the two following segments, but it seems unlikely that, if he had possessed a male of "*rufomarginatus*," he would have made no mention of it. In the collection of Mr. C. A. Frost are six specimens, three males and three females, identified by Dr. Van Dyke as "*rufomarginatus*?" I can see no difference between these and *T. abdominalis*.

Since the original description is difficult to obtain, I reproduce it here, translated from the Latin of Motschulsky:

"118. *Scalopterus rufomarginatus* Motsch. Female winged, elongate, posteriorly dilated, subdepressed, shining, with very short cinereous pubescence, black, the front, second joint of antennae, the sides of the thorax very broadly, the margin and suture of the elytra posteriorly, rufous, the anterior tibiae and the margins of the abdominal segments more or less rufescent; front between the eyes transversely impressed, antennae subserrate, the second joint short, the third equal to the first; thorax subelongate-rounded, margined, impunctate, the median line scarcely distinct; elytra about as wide as the thorax, anteriorly subparallel, posteriorly dilated, the apex broadly rounded, coriaceous, impunctate, the humeri distinct; abdomen coriaceous, finely punctate.

"Length,  $1\frac{1}{2}$  l. (3.4 mm.)—width  $\frac{2}{3}$  l. (1.5 mm.)

"Plate IV, fig. 27."

Since *T. abdominalis* has been so persistently identified as *A. rufomarginatus*, the possibility that Motschulsky's type was a female of that species, of whose description he was obviously unaware at the time, should be considered. Reference to the above description will show that *A. rufomarginatus* possesses the following characters, either explicitly stated or clearly implied. Antennae black, except the second segment, which is rufous; legs all black, except the anterior tibiae, which are rufescent; abdominal segments black, except for the margins, which are more or less rufescent; elytra impunctate. None of these characters is present in any specimen of *T. abdominalis* that I have examined. My present series of *T. abdominalis* contains 20 specimens and I have examined more than a hundred others in the last two or three years, but I have never seen one with a black abdomen. It would be unsafe to assert that such a variation does not exist, but the chance that Motschulsky was dealing with such a rarity is too remote to be given serious consideration. Like Fall (1917), I had three species, one of which I hoped would prove to be *A. rufomarginatus*. One of these was *T. abdominalis*, the second *T. neglectus* Marshall, and the third the species that I have just described as *Attalus santarosae*. The differences between this last species and the description of *A. rufomarginatus* are emphasized in the notes following the description of *A. santarosae*.

A series of ten specimens, from Paraiso Springs and Pasadena, California, contains some which correspond almost exactly to Motschulsky's description of *A. rufomarginatus* and I think are probably that species. The single male in the series is, however, definitely a *Tanaops*. If my identification is correct, which cannot be definitely proven or disproven until Motschulsky's type is available for inspection, the species should be transferred to *Tanaops*.

#### **Attalus difficilis** Leconte

See remarks under *A. lobulatus* and *A. utahensis*.

#### **Attalus rufipennis** Gorham

Gorham's variety "N" of this species, with "head and thorax black, elytra red, unspotted" occurs on Ceralbo Island, near LaPaz, just off the coast of Lower California and thus should be added to our official lists, which include Lower California.

#### MEXICAN SPECIES

The two following Mexican species were included in material sent me for identification by the California Academy of Sciences and are herewith described, so that the types may be returned to the Academy. The one species of *Attalus* is not included in the above key and I have not been able



to assign it to any of the species treated by Champion (1914) in his revision of Mexican and central American Malachiidae.

**Attalus limonis** Marshall, new species

*Male.* Oblong-ovate, the elytra moderately and uniformly widened posteriorly, the dilatation commencing just behind the humeri. Black; head anterior to a line joining the center of the eyes, broad lateral thoracic margins, all the elytral margins except the basal, four basal antennal segments, prosternum, anterior trochanters, last four abdominal segments, and central portion of posterior tibiae rufotestaceous. *Head* short and broad, inserted in the thorax to the eyes, front unimpressed, surface shining, very minutely and sparsely punctulate and pubescent. *Antennae* long, reaching the middle of the elytra, strongly serrate and pubescent. *Prothorax* transversely oval, 1.3 times wider than long, the anterior margin slightly produced; surface, punctuation and pubescence as on the head; rufotestaceous, with a large black, triangular discal spot, the base of the triangle occupying the central third of the anterior margin, its apex at the center of the posterior margin. *Elytra* shining, punctures fine and rather sparse, but much more prominent than on head and thorax; pale semi-erect pubescence rather sparse and inconspicuous, no erect black setae present. The pale sutural margin reaches about three-fourths the distance from apex to base and is widened near its anterior end, opposite a corresponding dilatation of the lateral margin, which is obsolete at the base and near the apex. Apices broadly pale. Pygidium small, piceous except at the lateral margins, quadrangular, truncate at the tip. *Under surface* and legs finely and sparsely punctate and pubescent. Anterior tarsus (the right missing) of unusual structure, the first and third segments elongate, the third apparently inserted on the tip of the first, the second inserted on the anterior face of the first at about its middle, its free lobe laterally compressed or twisted and extending over the third almost to its apex, the usual black margin of the lobe extremely fine. Abdominal segments with no distinctive modifications.

*Female.* Similar to the male, except as follows. Antennae much shorter, scarcely passing the thoracic margin and very feebly serrate. Head entirely pale, except the occiput; prothorax entirely pale; elytra definitely more dilated behind. Pygidium triangular, the apex narrowly rounded and with a small, acute notch at the tip. Last sternite with a median linear impression, the lateral areas tumid, piceous, more coarsely punctured and hairy.

Length, male 2.5 mm., female 2.7 mm.

Holotype, male and allotype, female, labeled "20 mi. n. El Limon, Tmlps., Mex., XI-10-46. E. S. Ross, Collector." Types in collection of California Academy of Sciences.

One female paratype, same data, in author's collection. The paratype

has the head and thorax entirely pale and the black elytral vittae are almost divided by the dilatation of the sutural and lateral pale margins.

The species resembles in its color pattern, both *A. albomarginatus* Champion (1914) and *A. viridivittatus* Champion (1914), each described from a unique male. These species are both smaller than *A. limonis*, not over 2.0 mm. *A. albomarginatus* has the elytra "fuseo-violaceous," with the margins whitish, the head densely punctate and shallowly foveate between the eyes, the antennae feebly serrate; "the femora are black, with the apices abruptly testaceous and colored like the tibiae." *A. viridivittatus*, which I have from Cuernavaca, Mexico, has the head foveate between the eyes, the legs testaceous, the elytral vittae green and the elytra "set with intermixed long semi-erect hairs."

### Sphinginus Rey

This name was proposed by Rey (*in* Mulsant and Rey, 1867), as a subgenus of *Attalus* and erected into a separate genus by Abeille de Perrin (1890). It contains four species from the Mediterranean region, one from the Canary Islands, and one from Guerrero, Mexico, described by Champion (1914). The present species is very close to *S. eburatus* Champion, differing mainly in that the thorax is black instead of rufous and the transverse elytral fascia is yellow instead of white, is broader than in *S. eburatus*, which is figured by Champion, and is not raised or eburate. The genus is separated from *Attalus* by the elongate, posteriorly narrowed thorax.

### *Sphinginus mexicanus* Marshall, new species

*Female*. Elongate, narrow, opaque, elytra scabrous. Black, an antemedian, interrupted, transverse elytral fascia and the posterior two-fifths of the suture, excepting the apex, yellow; tibiae and tarsi piecous. *Head* large, oval, one-tenth longer than wide, tempora strongly produced behind the eyes and converging, the front faintly bi-impressed; surface strongly alutaceous, punctures not evident, pubescence extremely fine and sparse. *Antennae* short, about reaching the posterior thoracic margin, scarcely serrate, moderately pubescent. *Prothorax* trapezoidal, length and width equal, anterior margin broadly arcuate, sides rounded in front, strongly converging and slightly sinuate toward the base, which is squarely truncate, with the basal margin strongly reflexed; sculpturation and pubescence as on the head. *Elytra* with a violaceous tint, moderately widened behind, densely scabropunctate, smoother near the apices, the pale pubescence very fine, sparse and inconspicuous, the erect black setae numerous and evenly distributed. The transverse yellow spot on each elytron extends from the lateral margin about two-thirds the way to the suture and is about twice as wide as long. Two tergites are exposed beyond the elytra; pygidium quadrate, with apex

truncate and slightly emarginate. *Under surface* shining, very finely and sparsely punctulate and pubescent, the last sternite with a semicircular emargination at the apex. Length 2.0 mm.

*Male* unknown.

Holotype, female, labeled "5 mi. S. Cuernavaca, Mex., XI-19-46. E. S. Ross, Collector," in the collection of the California Academy of Sciences.

One female paratype, which does not show any variation worth noting, in the author's collection.

### **Carphuroides** Champion

The genus *Carphurus*, established by Erichson in 1840, together with several other satellite genera, now forms the subfamily Carphurinae, which is characterized mainly by the presence of a black comb along the inner edge of the male first protarsal segments and which has its habitat in Australia and the Indo-Malayan region. One of the genera, *Carphuroides* Champion (1923) is distinguished chiefly by the structure of the male protarsi, segments two to four being narrow and obliquely prolonged beneath the following segments, whereas in *Carphurus* segment four is broadly dilated laterally to form a flattened emarginate lobe beneath the claw segment. Champion designated the genotype of *Carphuroides* as *Helcogaster pectinatus* Sharp, from Hawaii. The genus contains one species each in Rhodesia, Central America, Hawaii, and Japan, the remainder of the rather numerous species occurring in the Indo-Malayan region. The Central American species is *Helcogaster atratulus* Gorham (1886), described from two specimens, one from Panama, the other from Guatemala and not mentioned since in the literature, so far as I know. This was placed in *Carphuroides* by Champion at the time the latter genus was erected.

### **Carphuroides atratulus** (Gorham)

A single male specimen, from Cerralbo Island, in the Gulf of California, near LaPaz, Lower California, is either this or a very closely related species, the only noteworthy difference between it and Gorham's description being that the Lower California specimen has the basal third of the elytra testaceous. Considering the extreme color variability in so many of the species of *Malachiidae* and the impossibility of comparing it with Gorham's types at the present time, I do not feel justified in describing it as a new species and am reporting it as *C. atratulus*. As pointed out by Champion, both Sharp and Groham overlooked the tarsal comb in *C. pectinatus* (named for the pectinate antennae) and *C. atratulus* and Erichson makes no mention of it in his diagnosis of the genus *Carphurus* or the description of the two species which he included therein. The comb in *C. atratulus* is black, in

striking contrast to the testaceous tarsal segments, runs the full length of the first segment, along its inner border, has seven teeth and is about as wide as the segment itself. The species forms an interesting addition to our official list. The specimen in question is in the collection of the California Academy of Sciences.

Finally, for the benefit of future cataloguers, as well as present collectors, I wish to record a number of new localities for many of the species of the family, localities which are in addition to those recorded in the official catalogue (Leng, 1920) and its supplements. The identification of the specimens associated with these localities is either my own or has been checked by me. If some of the localities have been previously published, either by myself or someone else, the repetition of them here will do no harm. The species are listed in the order in which they appear in the Leng Catalogue.

*Collops cribrosus* Lec., South Dakota; *C. tricolor* (Say), Missouri, South Dakota, Montana; *C. sublimbatus* Schffr., Tennessee, North Carolina; *C. punctatus* Lec., Iowa, South Dakota; *C. dux* Fall, Arizona; *C. marginicollis* Lec., Lower California; *C. reflexus* Lec., New Mexico; *C. hirtellus* Lec., British Columbia, Idaho, Washington, Alberta, California, Nevada, Colorado, Oregon, South Dakota; *C. discretus* Fall, Utah; *C. subaeneus* Fall, Utah; *C. nigriceps* (Say), New York, Mississippi, Georgia; *C. floridanus* Schffr., Louisiana, Texas, Alabama, Mississippi; *C. bipunctatus* Say, Nebraska, South Dakota, Oregon, Idaho, Colorado, Wyoming, New Mexico, Texas, Utah, Mexico; *C. limbellus* G. and H., South Dakota, Texas, Pennsylvania; *C. flavicinctus* Fall, Texas; *C. granellus* Fall, Texas, California; *C. vittatus* (Say), Ohio, Maine, South Dakota, Colorado, California, Lower California; *C. necopinus* Fall, Utah, Arizona, Lower California; *C. punctulatus* Lec., South Dakota; *C. insulatus* Lec., South Dakota, Arizona, Texas, Lower California; *C. utahensis* Schffr., Idaho, South Dakota; *C. texanus* Schffr., Sinaloa, Mexico; *C. hystrio* Er., Lower California; *C. similis* Schffr., Arizona; *C. confluens* Lec., Texas, Nevada, California; *C. quadrimaculatus* (Fab.), Tennessee, South Dakota, Nebraska; *C. balteatus* Lec., Alabama, Florida; *C. versatilis* Fall, southern California; *Trophimus impressus* Sz., New Jersey; *Endeodes basalis* (Lec.), Lower California; *Malachius aeneus* (L.), British Columbia; *Anthocomus contortus* (Fall), Alberta; *A. horni* (Fall), Washington, Oregon, Idaho, Arizona; *A. mirandus* (Lec.), Washington; *A. theveneti* (Horn), Idaho, Oregon, Nevada; *A. mixtus* (Horn), Oregon, Idaho, British Columbia; *A. ulkei* (Horn), Wisconsin, Colorado, South Dakota, Quebec; *A. montanus* (Lec.), Colorado, Arizona; *A. floricola* (Martin), British Columbia; *A. antennatus* (Hopping), Nevada; *A. moerens* (Lec.), Oregon; *A. erichsoni* Lec., Manitoba, Texas; *A. flavilabris* (Say), North Carolina; *A. bipunctatus* Harrer, Pennsylvania, District of Columbia, New Jersey; *Tanaops terminalis* Fall, Arizona; *T. dubitans* Fall, Arizona; *T. mimus* Fall, Arizona, New Mexico, Texas, Sonora; *T. coelestinus* Gorh.,



New Mexico; *T. basalis* Brown, Oregon, Wyoming, Montana; *T. oregonensis* M. Y. Marsh., California; *Pseudebaeus bicolor* (Lec.), California, Oregon, British Columbia, Saskatchewan; *P. pusillus* (Say), New York; *Attalus serraticornis* Fall, Arizona, Texas; *A. dimidiatus* Fall, Lower California; *A. oregonensis* Horn, Arizona, Nevada, Lower California; *A. lecontei*, Champ., Colorado, New Mexico; *A. glabrellus* Fall, Arizona, Texas, Colorado; *A. terminalis* (Er.), New York, Ontario, Maryland, Tennessee, Michigan, Massachusetts, New Jersey, Manitoba, Minnesota, Iowa, Maine, Pennsylvania, South Dakota; *A. varians* Horn, Arkansas; *A. futilis* Fall, Arizona, Texas; *A. grisellus* Fall, Texas, South Dakota, Saskatchewan; *A. morulus* (Lec.), Colorado, Arizona, New Mexico, Utah, California, Nebraska, (Eastern records are for *A. greeni* Marshall or *A. frosti*, new species); *A. pallifrons* (Mots.), Kentucky, Pennsylvania, Illinois, Ohio, Mississippi, Saskatchewan; *A. semirubidus* Fall, Mississippi, North Carolina, Florida; *A. humeralis* Lec., Texas; *A. pectiti* Horn, Ohio; *A. rufiventris* Horn, New Mexico, Utah, California, Lower California, Sonora; *A. nigripes* Horn, Arizona, Oklahoma, South Dakota, Sonora; *A. otiosus* (Say), South Dakota; *A. circumscriptus* (Say), Texas; *A. cinctus* (Lec.), Lower California; *A. difficilis* (Lec.), Nevada, Colorado, Lower California; *A. lobulatus* (Lec.), Lower California, Sonora; *A. scincetus* (Say), Texas, South Dakota, Iowa, Kansas, Tennessee; *A. smithi* Hopping, Idaho; *A. texanus* Marshall, New Mexico, Texas, Colorado, California; *A. greeni* Marshall, Virginia, West Virginia, Tennessee, Pennsylvania, New Jersey, Maryland.

## BIBLIOGRAPHY

## ABEILLE DE PERRIN

1891. Malachides d'Europe et pays voisins. Ann. Soc. Ent. de France, 1890-91, 442 pp.

## BLATCHLEY, W. S.

1910. The Coleoptera of Indiana, Bull. 1, Ind. Dept. Geol. and N. R., pp. 839-846.  
 1914. Notes on winter Coleoptera in Florida. Canad. Entom., 46:88-92.  
 1922. New and rare Coleoptera from southwestern Florida. Canad. Entom., 54:27-33.

## BROWN, W. J.

1928. New Silphidae and Melyridae. Canad. Entom., 60:145.

## CHAMPION, G. C.

1914. Revision of the Mexican and Central American Malachiidae and Melyridae. Trans. Entom. Soc. of London, pp. 13-127.  
 1921. Revision of the African Species of Hedybius Erichson and its Allies. Annals and Mag. of Nat. Hist., 8(47):449-494.  
 1923. A Revision of the Malayan and Indian species of the melyrid Sub-family Carphurinae. Annals and Mag. of Nat. Hist., 12(67):1-54.

## ERICHSON, W. F.

1840. Entomographien Berlin, pp. 44-134.

## FALL, H. C.

1897. List of Coleoptera of southern California Islands. *Canad. Entom.*, 29:233-244.
1901. List of the Coleoptera of southern California. *Occ. Papers, Calif. Acad. of Sci.*, 7:242.
1912. A review of the North American species of *Collops*. *Journ. N. Y. Entom. Soc.*, 20:249-274.
1917. Short Studies in the Malachiidae. *Trans. Amer. Ent. Soc.*, 43:67-88.

## GORHAM, H. S.

1886. *Biologia Centrali-Americana, Coleoptera III, Pt. 2*, p. 323.

## HOPPING, R.

1937. New Coleoptera from western Canada VI. *Canad. Entom.*, 69:89-91.

## HORN, G. H.

1870. Contributions to the coleopterology of the United States. *Trans. Amer. Ent. Soc.*, 3:69-97.
1872. Synopsis of the Malachiidae of United States. *Trans. Amer. Ent. Soc.*, 4:109-127.
1894. The Coleoptera of Baja California. *Proc. Calif. Acad. of Sci.*, series 2, 4:302-449.

## LENG, C. W.

1920. Catalogue of the Coleoptera of America, north of Mexico. John D. Sherman, Jr., Mt. Vernon, New York, pp. 145-146.

## MARSHALL, M. Y.

1944. A new *Tanaops* from New Mexico. *Canad. Entom.*, 76:164-166.
1946. Studies in the Malachiidae. *Canad. Entom.*, 78:183-195.
1949. Studies in the Malachiidae II. *Entomologia Americana, new series*, 28(4):113-144.

## MOTSCHULSKY, T. V.

1859. Coléoptères nouveaux de la Californie. *Soc. Imperiale Naturalistes Moscou, Bull.*, 32(3):406.

## MULSANT, E. AND REY, CL.

1867. *Histoire Naturelle des Coléoptères de France*, Lyon. XVIII, Vésiculifères, p. 180.

## SAY, THOMAS

1823. Descriptions of coleopterous insects collected in expedition to Rocky Mountains. *Jour. Acad. Nat. Sci., Phil.*, 3:185.

## TANNER, V. M.

1936. Description of two new melyrids from Utah. *Proc. Ut. Acad. of Sci.*, 13:153.